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CURRENT *History*

**A MONTHLY MAGAZINE
OF WORLD AFFAIRS**

JULY 1964

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CURRENT History

JULY, 1964

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In this issue, seven articles explore the nature of the arms race today and the difficulties encountered setting up international control of weapons. Our introductory article is based on the premise that weapons control under cold war conditions need not imply the abolition of weapons. Urging caution, this writer says that arms control measures "must be judged on their own particular merits."

Cold War and Weapons Control

By LAURENCE W. MARTIN

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Johns Hopkins University*

THE ATMOSPHERE of East-West relations in recent months has been one of almost ostentatious optimism. One might therefore assume it would be possible to proceed much more optimistically than hitherto toward arms control and disarmament. Such optimism would be overdone, however, if it did not take account of the extent to which the mutual overtures of the United States and the U.S.S.R. are largely the result of the military balance they have achieved with each other. Major departures in arms control thus entail rearranging the very basis of the present *détente*.

It is true that there are causes other than the military balance to account for the new moderation in Russian tone: the rivalry of China and the preoccupation with the demand on the economy of consumers in the pursuit of "goulash communism." But the Sino-Soviet rift, though unquestionably deep, will not necessarily remain a restraint on Soviet aggressiveness. Under changed circumstances or new men it might push Russia into efforts to outdo China in a hard policy

rather than, as at present, into setting a peace-loving contrast. In addition, the internal pressures for relaxation may not yet be irreversible. If they were to proceed so rapidly as to endanger the limits set by the regime, in defense of their continued political dominance, the leadership might be tempted to sharpen external tensions as a pretext for renewed discipline.

Thus, while the present relaxation of tension rests on circumstances that are to be welcomed and reinforced, and while one form of such reinforcement may well be arms control, the improvement has not proceeded so far that specific measures of arms control can be based on mere assumptions of goodwill rather than on calculations of national interest and of reliability.

It has long been argued that disarmament has immense benefits to confer: economy of resources, reduction in men's capacity to do each other mischief, and, according to some theories, removal of one of the prime causes as well as instruments of international conflict. The difficulty is, of course, that weapons

have historically been the ultimate source of national power and hence the ultimate protection of the fundamental political purposes that each state is unwilling to trust to the mercy and good faith of others.

Modern technology has, it is true, made men look askance at the kind of security weapons provide and at their clumsiness as instruments of policy. Nevertheless, claims that weapons are wholly obsolete or outmoded instruments of policy are mistaken. The uses of military power in limited ways, as in Algeria, Vietnam or the Congo, are obvious, while even those great strategic weapons that serve to neutralize the major forces of the adversary are, in so doing, freeing the nation to use its other forms of power as it would not otherwise dare to do.

It would be foolish to be pleased with such a system. We must be careful not to deduce from this, however, that some better solution must easily be available. The world is not so amiably arranged as this, and frequently the alternatives to bad situations in international politics are only worse. Better substitutes for the military balance may be available, but this is a matter for investigation rather than assertion. Modern military establishments are complex organisms, delicately balanced both within, among their own component units, and without, in relation to the forces of other nations. Measures of disarmament and arms control entail dismantling and rearranging these complicated structures. The difficulty and the riskiness of such an operation are obvious and those who undertake it must constantly guard against creating a situation more unstable than the one with which they began. The risk of arriving at a state of imbalance and therefore of danger of war during the buildup of an arms race is frequently deplored; the somewhat similar possibilities during the process of tearing down are less often acknowledged.

INCENTIVES TO ARMS CONTROL

Once these caveats have been entered, it must be recognized that the present-day state of military affairs presents each of the superpowers with possible incentives to seek ways

of making the strategic environment safer and cheaper, even if they cannot resolve the fundamental conflict of their political purposes. Admittedly, one time-honored school of thought argues that substantial disarmament cannot precede general political settlement, because weapons are merely the instruments of policy and hence the symptoms rather than the disease. To this there has been a traditional counterargument that armaments are themselves autonomous sources of conflict as well as symptoms thereof; that high levels of armament create an atmosphere of tension, incite states into a race to forestall the efforts of others, to seek out strategic bases and frontiers, and to enthrone military and industrial leaders with a vested interest in international tension. Ultimately, the national interest becomes defined predominately in terms of military security.

This argument is commonly overdone when it is carried to the point of implying that arms are the primary source of conflict: economic, political and ideological ambitions and fears provide ample alternatives. But certain features of modern military technology have undoubtedly lent new plausibility to the thesis that it might be useful to launch an attack on the military complex without waiting for more fundamental political settlements, for both Russia and the United States have come to recognize serious shortcomings in their military efforts, when judged as instruments of rational policy.

On the one hand, modern technology has endowed the arms competition with a self-sustaining quality, so that many new steps have to be taken—less for any clearly conceived political or even strategic purpose than for fear of missing an important point that one's adversary may exploit, in the accelerating process of research and development. On the other hand, the results of this process have proved generally disillusioning to both Russia and the United States. Each of the superpowers seems to have gone through a phase in which it believed technical success would provide it with decisive political advantages. For the United States this phase was perhaps the era of "massive retaliation"

in the mid-1950's, while the tough line of Nikita Khrushchev over Berlin and Cuba may well have reflected a similar nuclear euphoria following the birth of his ICBM's¹ in 1957-1958.

Each nation has subsequently discovered—the United States in Vietnam and the Near East, for example; Russia in Berlin and Cuba—that its military posture was not easily translated into political advantage. Neither nation is able to defend its homeland against an attack by the other or to eliminate its opponents' striking force by a preventive strike. Thus deadlock rather than breakthrough seems to be the reward of energetic competition in strategic weapons. As a result, we have heard Chairman Khrushchev sing the praises of the more limited form of struggle he calls peaceful coexistence, and United States Secretary of Defense Robert McNamara admits a strategic stand-off in which our initiatives must be increasingly political rather than military.

Thus, even within a context of continued political enmity, it has become possible for the superpowers to see possible advantages in measures to slow down the arms race and to avoid situations in which the catastrophic strategic forces might actually have to be used. The elusiveness of major political settlements has in any case made it clear that if an effort is ever made to bring weapons under agreed control it will have to be without benefit of prior political reconciliation. This is, indeed, a narrow and negative basis on which to proceed, but a certain added optimism has accompanied development of the concept of arms control and thereby of an increased perception of what might be done to make the military environment safer without abolishing it.

As distinguished from the traditional notion of disarmament entailing the reduction or abolition of weapons, arms control describes any measures to stabilize the military environment and make weapons more reliable servants of rational political purpose. Arms control avoids many problems besetting the tra-

ditional type of disarmament because it not only need not imply the abolition of weapons—and hence the necessity for agreement on an alternative basis of international order—but also need not even require explicit international agreement upon the arms control measures themselves. Measures of arms control can be agreed upon between two or more nations but they can also be adopted unilaterally by states deciding to avoid strategies that are provocative or weapons systems that are difficult to control.

A SLUGGISH ARMS RACE

A great deal of such restraint is already observed. The so-called arms race is a sluggish affair compared to what the great powers might do if they really strained their resources and exerted themselves. Both the United States and Russia, for example, are apparently refraining from an all-out effort to acquire an anti-missile missile that might upset the present balance and set off a new generation of technological competition. Similarly, American missile production is being cut back well below the desires of some military leaders, while the Soviet Union's own intercontinental missile program is clearly a very limited one.

Both nations have shown considerable caution in deploying nuclear weapons: the Soviet Union has not, so far as we know, brought nuclear warheads forward into Eastern Europe from its own territory, and America has dismantled its IRBM² bases in Western Europe and is anxious to avoid their reintroduction. Both Russia and the United States have been careful not to encourage other states to acquire nuclear weapons and even in the Cuban case—otherwise a notable exception to Soviet caution in deployment—Russia's precautions to keep the most dangerous weaponry in its own hands were conspicuous.

Finally, it may be noted that the United States has tried to develop strategies, such as a "no-cities" counterforce doctrine, that would maximize chances of keeping a nuclear conflict under some kind of control if it occurred. The Soviet Union appears less concerned with such refinements, though there

¹ Intercontinental Ballistic Missiles.

² Intermediate Range Ballistic Missile.

are some signs to show she is backward rather than recalcitrant. Here it must be admitted, however, that the American doctrines are not merely designed for general safety; they are also designed to enable the United States to fare better than Russia; a purpose with which Russia can hardly be expected to concur.

The latter consideration comes close to explaining why so relatively little has been achieved in the way of explicit arms control agreements. Such agreements all tend to have specific strategic implications, favoring one side or the other. Each nation naturally advocates the measures that will give it an advantage over others. The United States, for example, stresses a cut-off in production of warheads and delivery vehicles, having already a clear superiority. Meanwhile Russia favors sharp reductions in existing forces in an effort to cut down American superiority.

Similarly, nations tend to favor cuts by percentages in areas where they have an advantage, thus leaving their lead intact. At the same time, they lean toward setting absolute ceilings in areas where they are deficient, thus moving toward parity. Moreover, while it is the merit of some arms control schemes that they do not require much inspection, most far-reaching measures do require a system of verification. Here is one of the great asymmetries of our cold war world, for the Soviet Union, being a closed society, stands to lose much more than America by inspection which would not only impair the secrecy that is one of Russia's major military assets but might also challenge many of the bases of her society. In this respect it should not be overlooked, however, that the United States Congress might well have its own doubts about permitting widespread inspection of American installations while the atmosphere of the cold war persists. Verification is difficult technically, but these difficulties are very probably a smaller obstacle than the political objections.

The difficulties of extensive arms control go beyond the strategic asymmetries. Arms control may be intended as a politically neutral method of manipulating the military environment, but in practice it inevitably has political implications. East Germany's participation

in the nuclear test ban treaty, for instance, raised difficult diplomatic questions. The differential impact of arms control agreements sets particularly trying problems for alliances. Again, the test ban treaty was undoubtedly an affront—and a more or less deliberate one—to France and to China. Proposals for observer posts in Central Europe arouse anxieties in West Germany—as a sign of discrimination against her or as a further step toward recognition of East Germany and the territorial status quo.

America's project of a multilateral sea-borne nuclear force (MLF) provides a vivid example of the complexities of such affairs. The United States regards MLF as a contribution to arms control, possibly heading off German nuclear ambitions and tempting France and Britain to give up their national deterrents. Russia, probably genuinely, regards the project as dissemination of nuclear weapons, and declares the proposal will preclude other agreed arms control measures, including a possible international agreement against nuclear proliferation. But if the United States accepted an implied proposal to give up the MLF in return for an anti-proliferation agreement with Russia, this would readily be interpreted as an anti-German move and thereby encourage Germany to turn to France as the other, if inferior, source of nuclear weapons, thereby bringing about the result that MLF was intended to prevent. These difficulties are not mere illusions or the result of bad thinking that can easily be reasoned away. They reflect real differences of national interest. It is, after all, not unnatural that nations will have divergent views of efforts to manipulate the fundamental source of national security.

COMPLETE DISARMAMENT

The infinite complexities of arms control have encouraged some to maintain that the only hope of cutting the knots is to move directly toward general and complete disarmament (G.C.D.). A rapid plunge for complete disarmament, it is argued, would avoid many of the delicate balancing acts of arms control and produce, ultimately, a far safer world.

The most spectacular official espousal of this notion was Khrushchev's proposal in 1959 of a plan to achieve total disarmament in four years. Piqued by the propaganda advantages Russia seemed to be securing from this sally, the United States hastily concocted its own proposal for G.C.D., to be achieved in three stages taking something over six years.

Few governments dare disavow such projects but it is obviously an illusion to believe they are less difficult than arms control. In a limited space it can only be pointed out that, so long as we do not assume an end to Soviet-American rivalry—indeed, if we do not assume a radical change in the behavior of all states—G.C.D. will require establishing a system under which bitter struggle can continue without leading to rearmament.

It is perfectly clear that a struggle would continue. The Soviet Union is particularly frank on this point. Peaceful co-existence is a struggle by other than military means. Moreover, the category of wars most prevalent today—armed conflicts in underdeveloped areas that Russia chooses to interpret as wars of national liberation—are specifically excepted from the category of prohibited wars. In Khrushchev's more recent proposals for the peaceful settlement of territorial disputes, such wars of liberation—including the case of China's designs on Formosa—are again excepted. And it must be recognized that, even if the agreed levels of armament were actually achieved, the residual "internal security forces," subversive propaganda and economic weapons would form ample bases for continued struggle.

The United States perceives this and a large part of its G.C.D. proposals consists of arrangements—admittedly very vague and impractical arrangements—for enforcing rules of international conduct and peaceful settlement, the whole to be backed up by an irresistible international peace force. In the words of the chief United States negotiator:

If we achieve our goal of general and com-

plete disarmament we will rid ourselves of great national armies and the threat they have posed to the peace. But other forms of power will remain. . . . We will still be faced with conflicting ideologies and with political struggles. . . . Nations, however much we try to develop a cooperative atmosphere, will remain competitive, and we cannot reasonably expect that all statesmen and all politicians will conduct their international relations unfailingly with wisdom and generosity.

* * *

. . . Our vision is of a world without war, but if this vision is to be realized we must have an alternative realistic system for coping with such differences and disputes as will inevitably arise.

* * *

So, general and complete disarmament on the one hand and improved peace-keeping machinery on the other are but two sides of the same coin. We cannot have one without the other. Either we develop effective institutions for settling international differences and keeping the peace, or we in effect abandon our hopes for general and complete disarmament.³

To the Soviet Union such views are merely obstructionist efforts to perpetuate American interests. Russian efforts to point this out make it clear that just as the United States hopes its designs for disarmament would produce a world safe for its interests, so the Soviet Union intends disarmament to set the stage for continuing revolution. Thus, rebutting the American position, the Soviet negotiator declared:

. . . As we know, far-reaching changes are taking place throughout the world as a result, on
(Continued on page 50)

Laurence W. Martin received his formal education on both sides of the Atlantic, at Cambridge and at Yale. In addition to his teaching duties, he is now a Research Associate at the Washington Center of Foreign Policy Research. He has served as consultant for the Institute for Defense Analyses, the Department of State and the Council on Foreign Relations. Among his books are *Peace Without Victory: Woodrow Wilson and the British Liberals* (New Haven: Yale University Press, 1958) and *Neutrals and Nonalignment: The New States in World Affairs* (New York: Frederick Praeger, 1962).

³ See transcript of negotiations at the Eighteen-Nation Disarmament Conference, May 21, 1962, U. S. Arms Control and Disarmament Agency, Document 303, pp. 1-2.

"Each new weapons system takes many years to develop and perhaps even more to become an operational part of the arsenal," points out this specialist. "The weapons of this decade have been . . . a product of the weapons planning cycle."

Weapons and Technology, 1964

By T. C. O'SULLIVAN

Manager, System Requirements Section, Raytheon Company

WHILE THE CONCEPT of deterrence has been in practice for some time, only in the past decade has it been meaningful to the American people.¹

Concepts of military strategy have developed through history. Once armies could be sent to stop the advance of military expeditions. Population and property were protected by denying enemy access. For the past century in the United States, we have been strong enough, or it has been technologically difficult enough, for such access to have been denied to the enemy. Another defensive measure was the construction of fortress cities and castles to protect the population and property physically when armies could not be stopped at a distance, or where it was just too expensive or too risky, or the threat too diffuse to rely on defending at a distance. For the United States, nature has acted as the barrier.

Traditional defenses were lost to Europe long ago as the technology of war overtook them. Aggressors began to worry about counterattack on their homeland. Concepts of deterrence, as we think of them today, were born. "Hangers on," such as the Maginot Line, failed to provide protection. For cen-

turies, Europe, Russia and even China have known the bitter taste of foreign armies bringing destruction—destruction and abuse to property and population.

In World War I, the pattern for the United States was to send out our armies. The same pattern was followed in World War II, and then only after an attack on our military forces stationed at a Pacific outpost, Hawaii—still a possession, not yet a state. The technology of war had not yet overtaken the geographic protection given the United States. There were occasional forest fires set by incendiary devices wafted in on the Pacific breezes. On the East Coast there were reports of submarines landing small groups. But there was no major destruction. Air raid drills seemed primarily to serve the psychological purpose of unifying the country behind the war effort.

Later, in the 1940's and early 1950's, as aircraft range increased, a wall of air defense was built, seemingly sufficient to keep out an overzealous enemy. Then came the missile. We could no longer physically guarantee the lives and property of our citizens at home. Modern weapons technology had taken away the older forms of defense. The threat of counterattack became the main thrust of our security program. We have reached the day that was predicted in the 1957 treatment of this subject in *Current History*:² "the development of modern nuclear weapons and

¹ The author wishes to express his thanks to Charles Sorrels for his assistance in gathering background information for this article.

² See Jerome H. Spingarn, "Arms and Technology," *Current History*, October, 1957.

their wide distribution is proceeding to a point where they will cease to provide a guaranty of national security, in the sense that security represents an ability to protect life and property, but merely provide a capability to retaliate."

The growth of arms and technology has had an impact on our society sufficient to attract the legitimate concern of the non-technician and the non-military citizen. Arms and technology have earned a place in the newspaper columns, at the dinner table, and on the debating platform. Today the United States and the Soviet Union both have large military forces, resplendent with sophisticated equipment, and stocked with weapons including nuclear devices. Who would dare make a direct military strike against either?

The United States need not fear an attack from its neighbors, nor from distant countries despite drastic political and ideological differences. The Soviet Union has her differences with China, but no serious analyst expects China to launch even a local border attack against Russia. Western Europe does not pose a serious threat to the Soviet Union and is not likely to, unless there is true European political integration allowing full central control over the military and economic resources available—the security of each from attack by the other is based primarily on the capability to retaliate. But while neither the United States nor the Soviet Union courts a major confrontation with the other, and while neither dares score too great a single victory over the other, conflict can be, and is, carried on at lower levels.

What are the relative strengths of the Communist and Western blocs? How destructive are the weapons? What has technology done to help us towards recovery from nuclear attack? What weapons are on the horizon? What weapons are beyond the horizon? What determines which weapons will be developed?

Although figures do vary as one researches

in this field, it has been estimated³ that early in 1964 the Western alliance had over 600 ICBM and Fleet Ballistic Missiles compared with something over 200 held by the Communist bloc. However, the Communist bloc had some 800 missiles with ranges of 600 to 2,100 miles, many capable of handling nuclear warheads. (Presumably some of these could be mounted on frigates or freighters thereby posing a threat off the United States seacoast.) While the West is credited with 33 nuclear submarines and the Communist bloc with 23, the balance is in the other direction for conventional submarines, 446 to 219. The West is listed as having over 600 long-range or strategic bombers, and the Communists only 200. In medium-range land-based bombers, the West is outnumbered 2:1, although most of this is compensated for by the medium-range carrier-based bombers of the Western powers.

Neither side seems to be lacking in sufficient delivery systems. However, if either side uses them to deliver nuclear weapons on the other, the capability to retaliate seems assured. Both sides appear to have an ample stock of nuclear warheads with which to outfit their delivery vehicles. Qualitatively, the United States nuclear weapons have a lower yield, giving the advantage of allowing comparatively discriminating use of nuclear weapons by limiting damage to the vicinity of the intended target. The larger-yield Soviet devices are better at routing out missile sites or military command posts that have been "hardened" to withstand the blast of smaller or distant nuclear explosions.

A surprise first strike aimed by one at the others' force capability, while sure to be highly damaging, is also certain to fail completely to accomplish its mission of "disarming" the opponent of his nuclear weapons.

A decade or so ago, the United States had a decisive strategic advantage over the Soviet Union. Now, although the advantage remains, the decisiveness is gone.

THE TECHNOLOGY OF COUNTERFORCE

Because the sudden development of a disarming first-strike counterforce capability is

³ See *The Military Balance*, 1963-1964, (London: The Institute of Strategic Studies, 1963). [Pamphlet: \$1.00 post free, send to 18 Adams St., London, England.]

felt to be extremely destabilizing, and because counterforce targeting requires better timing, better intelligence, and greater force effectiveness, we shall discuss some of the technical problems associated with it.

From available estimates, it appears that more than two-thirds of the West's strategic force is based on aircraft. In spite of the fact that Soviet air defense has demonstrated its powers on several occasions during the past few years, there are substantial chances that United States bomber forces could penetrate it. To increase the probability of an attacking force penetrating enemy defense and accomplishing a counterforce mission, we could increase the number of bombers, and increase the accuracy of the delivery weapons, or increase the yield of the weapons delivered. On the other side of the coin, to protect our weapons against such an attack, we would have to improve our active defenses (earlier radar warning, better positioning of incoming targets, better ground-to-air missile accuracy, better airborne defenses) and harden or disburse our forces.

There is constant competition between offensive and defensive force, instituting measures and countermeasures, to gain a qualitative advantage. While in general, airborne craft seem to have a technical disadvantage, there is one important area where this is not true. High-speed, low-flying (ground hugging at a few hundred feet altitude) aircraft are not very vulnerable to radar. Traveling at several times the speed of sound this kind of flying is very dangerous. The development of a plane with sophisticated automatic terrain avoidance features could break the countermeasure cycle and provide the developer with an advantage. This type of development might take only a few years. However, while this would insure some penetration of enemy defenses, it would not insure the ability to take out a sufficient quantity of the enemy's strategic force to make the attacker safe from

retaliation. The enemy has had an opportunity to harden and disburse his force. As to aircraft, cover could hide them, or with small warning they could be airborne and off to their own targets. Missiles have already been made mobile, put to sea, placed in hardened holes or silos in the ground, and can respond rapidly enough to be fired before an enemy air attack could be completed.

Table I summarizes some of the other weapon systems and arms control implications of specific advances in technology. This table was taken from a paper⁴ by Clark C. Abt presented at the Second Annual Arms Control and Disarmament Symposium in 1964.

ACTIVE AND PASSIVE DEFENSE

While it is hard to conceive of a situation in which either the United States or the Soviet Union would initiate a nuclear attack even if it calculated that it could cause more damage than it would receive, there is at least the possibility. In this event the "harder" the population, the less life would be lost.

There are two ways of protecting the population against possible attack, one active, the other passive. Active defense involves physically stopping the incoming delivery vehicle. Passive defense allows the weapons to come in and detonate, but tries to protect the population or property in other ways, usually through civil defense programs.

Recent United States disarmament proposals have dealt with the problem of active defense. On the surface, effective active defense would seem to be desirable. Why should our proposals at the Geneva disarmament conference call for the elimination of anti-ballistic missile systems (ABM) from future arsenals? Primarily because they are felt by some to be the ultimate counterforce weapon. If we cannot find or hit all targets where they are deployed, it is sufficient if we can stop the missiles carried by those targets after they are launched but before they reach their destination. If an effective anti-ballistic missile system could be developed and deployed, it could serve as a backup to a counterforce blow, filtering out and destroying the retaliating missiles not eliminated by the initial attack.

⁴ See Clark C. Abt, "Arms Control and Disarmament Implications of Future Weapon Technology" (paper presented at 2nd International Arms Control and Disarmament Symposium, Ann Arbor, Michigan). [Mimeo copy available from C. C. Abt, Raytheon Company, Bedford, Mass.]

Table 1

**Typical Arms Control Implications of Technological Advances
Applicable to Future Weapons**

Typical Technological Advance	Effect on Future Weapons Systems	Arms Control Implication
Major improvement in accelerometer accuracy	Major increase in ICBM accuracy	Mutual vulnerability of hardened ICBM sites, which may lead to an inventory race. Strategic instability due to restored first-strike advantage.
Major increase in specific impulse of solid fuel rocket motors	Smaller, more easily mobile ICBM's	Cheap survivability through mobility—secondary (Nth) powers can achieve credible strategic deterrents—control problems and dangers of unauthorized initiation—difficult inventory inspection.
	Faster climbing, higher intercepting AICBM missiles (after decoy sorting)	Increased technical feasibility of AICBM countermeasures counter-countermeasures race, greater uncertainty of deterrent balance.
Increased oceanographic knowledge and increased sonar range	Longer-range ASW submarine target discrimination	Possible destabilization of deterrent balance, if missile-launching submarines are major source of deterrence and become vulnerable to ASW—preemption pressures, due to vulnerability.
Cheap rocket boosters	Large military satellites in large numbers available to U.S. and U.S.S.R.	Space weapons race possible—command and control problems; possible escalation from mutual preemptive intercepts.
	IRBM's and ICBM's available to many secondary powers	Nth Country threat—deterrence undermined by difficulty of identifying the aggressor.
Cheap, light-weight nuclear power plants, compact shielding	Field armies relatively independent of heavy logistic support of fuel and ammunition; smaller submarines	European disengagement may be safer due to increased feasibility of U.S. forces being airlifted in case of Soviet invasion—less dependence on vulnerable ocean transport. Smaller subs, deeper diving, harder to control.
Odorless pacifying gases	Counterinsurgency weapon not damaging to intermingled native population	Major reduction in military and political cost of tranquilizing internal revolutionary wars —Nth country diffusion problems —could also be used by tyrants to consolidate (possibly Communist) regimes —inspection problems

No such system exists but some of the capability exists today. Although there are reports of some ABM installations being put in around a few choice Soviet cities, neither side can hope for an effective system over the next few years. Even then the cost would dwarf the costs of other weapons systems. If such systems were developed in quantity, the same game of penetration measure, countermeasure, counter-countermeasure, would evolve as it has for aircraft. It is therefore unlikely that an effective and credible ABM system could ever be deployed.

National civil defense programs, although under attack as being irrelevant or ineffective, have promoted construction of fallout shelters to help harden the population. Business organizations have hardened their records to preserve data on accounts receivable and payable, and to preserve information needed to determine tax responsibilities. Military and governmental agencies have set up alternate headquarters and schools have entered into community shelter programs. The Russians are reported to be working on a pill that will chemically "harden" the human body, protecting it against certain forms of radiation. Decompling of military targets from urban areas by relocating them has been called for in order to give the Soviets the choice of not causing excessive damage. Even with these precautions, the potential damage resulting from nuclear war seems very severe.

If the Boston area were hit by three bombs totaling 28 megatons, 1,000,000 people would be killed on the first day and 1,000,000 would be fatally injured leaving about 450,000 sur-

viving injured and 270,000 uninjured.⁵ In the category of physicians there would be only 640 uninjured and 1,070 surviving injured. The rest of the 6,560 from the area would be killed.⁶

From a similar attack with a 20 megaton ground burst, all structures, even the most heavily reinforced concrete structures and deep blast structures, would be demolished within a four mile radius, and all frame and brick buildings would be destroyed within six miles. At 10 miles, reinforced concrete buildings would be seriously damaged and all other structures demolished. At 15 miles all frame buildings would be destroyed and serious damage would result from flying objects carried by shock waves.

At distances of 16 to 21 miles from the burst, the ignition of houses, foliage, oil tanks, would create huge fire storms swept to the center by winds of 150 to 200 miles per hour, then maintained by lower velocity, fire-caused winds.

As much as 4,000 squares miles could be exposed, within 48 hours of the blast, to enough contamination to be lethal for 50 per cent of the population.

The few physicians available⁷ would have to decide whether to treat the wounded immediately at the expense of lowering their own chances for survival, or to seek fallout protection in hopes of emerging at a safer time to help the surviving. If they chose to risk their own lives they would have to decide which cases were most hopeful, perhaps ignoring the dying. Treatment facilities would be make-shift. The Commonwealth of Massachusetts has 209 hospitals and only 38 are outside the blast and fire storm area of a typical attack⁸ on the state. Of almost 660,000 hospital beds, only 9,500 are outside the blast and fire storm area.

But medical recovery is only one aspect of the problems of recovery. Economic and governmental recovery, and the balance of nature must also be considered. (For an absorbing fictional and philosophical account of these problems, see Walter M. Miller's 1960 book, *A Canticle for Leibowitz*.) Estimates of ten years have been given for the necessary

⁵ For an excellent summary of weapon effects, see S. Arnow, F. R. Ervin, and V. W. Sidel, Eds., *The Fallen Sky. Medical Consequences of Thermonuclear War* (New York: Hill & Wang, 1963).

⁶ These are direct types of manpower losses. For discussion of indirect kinds of manpower losses, see F. C. Ikle, *The Social Impact of Bomb Destruction* (Norman, Okla.: University of Oklahoma Press, 1958).

⁷ For a personal report by a physician who lived through Hiroshima, see Michihico Hachiya: *Hiroshima Diary: the Journal of a Japanese Physician*, edited by W. Wells (Chapel Hill: University of North Carolina Press, 1955).

⁸ *Effects of Nuclear War: Summary Analysis of Hearings*, before Joint Committees on Atomic Energy, U. S. Congress (Washington, D. C.: Government Printing Office, 1959).

rebuilding of cities, complete with slums.⁹ Maintenance of a governmental structure will depend on the size of the attack and the preparation made. To supply local order on an interim basis, the New England Town Meeting form of government seems to show the greatest promise.

The potential ecological upsets involving damage to plants, insects and animals are less predictable. Notable examples¹⁰ of individual upsets in the balance of nature have resulted in wiping out forests or local populations of whole species. Fallout radiation is differentially damaging to vertebrates, insects and plants. Vertebrates are the most sensitive to radiation. Insects are much less so. Some plants will be damaged; others will go unharmed. With fewer vertebrates to keep the insect population down, insect population explosion should result. For most insects, plague population would be achieved within one to a few summers. The expected result, stripping the land, would lead to erosion and dust bowls.

WEAPONS OF THE FUTURE

But these are the effects of today's weapons. What of the weapons of the future? Table 2 shows some of the advance systems currently under development or consideration and possible to achieve between now and the 1970's.¹¹

Table 2

Advanced Systems under development or consideration and which could be developed between 1964 and the 1970's

- 1964 *Wall Eye*—Developmental version of an unpowered 1,000 lb. glide bomb, probably optically guided.
- 1965 *XB-70 Strategic Bomber*—Three units of this Mach 3 delta-wing bomber (a strike-reconversion has been proposed) to be in operation.

⁹ See Herman Kahn, *On Thermonuclear War* (Princeton: Princeton University Press, 1960).

¹⁰ See Tom Stonier, *Nuclear Disaster* (Cleveland and New York: World Publishing and Meridian Books, 1963), especially chapter 11.

¹¹ For fuller discussion, see M. N. Golovine, *Conflict in Space: a pattern of war in a new dimension* (New York: St. Martin's Press, 1962), chapter 5.

Improved Minuteman—The advanced (Wing VI) version will have increased range, accuracy and payload.

- 1966 *ILAAS Plane*—An integrated light Aircraft Avionics System to convert an existing Navy Fighter for low altitude interdiction roles.

Phoenix—A long-range air-to-air missile with greater range than the Falcon and a nuclear or high explosive warhead.

MMRB—A mobile medium-range Ballistic Missile.

- 1967 *TFX*—Mach 2.5 fighter to fly subsonic low altitude ground support and interdiction, long-range ferry ability, and long duration fleet air defense and beachhead support.

Nike X—Anti-ICBM having both high-altitude, long-range and low-altitude intercept capability.

- 1968 *Dromedary*—A long-range endurance plane to receive early studies but not to supplement our strategic force until the 1970's. It is a turbo prop craft capable of two to three day flights to be used as a launch platform or a command and control post.

- 1969 *LASV*—Low-altitude supersonic intercontinental vehicle propelled by a nuclear air breathing fan jet.

- 1970 *AADS-70*—The Army's air defense system for the 1970's, a maneuverable, standardized ground-to-air missile to handle all sorts of air threats to field forces or facilities.

These weapons are primarily related to aircraft and missiles; other weapons are also
(Continued on page 50)

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This specialist points out that "official American thinking seeks to enhance" the role of conventional weapons "as a means of controlling the use of nuclear weapons." Thus, as he says, an evaluation of the world's armed forces is especially important for a study of weapons control.

Weapons and Men, 1964

By ALLAN S. NANES

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ANY SYSTEM of arms control, to be reasonably effective, must start with reliable information concerning the world's armed forces and the weapons they employ. This is particularly true today, when weapons systems play such a critical role in shaping strategy.

But arms control cannot be projected solely on the basis of statistics. Control must be related to the broad world picture, to an objective analysis of political and economic conditions. These conditions are presently characterized by a slackening of East-West tension (although hardly its elimination), a rift within the Communist world and within the Western alliance (although the latter has not attained the bitterness which characterizes the former), and the continuing quest of emerging nations for economic development. Specific areas of tension, such as Berlin or Vietnam, may be a constant feature of the world scene, or like Cyprus and Zanzibar, they may rise to the surface suddenly. It is against this backdrop that weapons policies are formulated, and that arms control negotiations must be conducted.

For any such negotiations to be successful, the parties must believe that proposed reductions will not jeopardize their security. It has always been difficult for negotiators, even with the best will in the world, to reach such conclusions. With the suspicions that obtain today, the difficulties blocking the attainment of mutual confidence are almost insuperable.

But the very destructiveness of modern weapons renders the continuing search for arms control and disarmament a necessity.

Although nuclear weapons are the overriding fact of modern strategy, conventional forces still have a role to play. Indeed, official American thinking seeks to enhance that role, if possible, as a means of controlling the use of nuclear weapons. Since American strength remains the backbone of the Western alliance, it would be well to begin by detailing that strength.

According to the British Institute for Strategic Studies, whose annual compilations are generally accepted as authoritative, the United States armed forces, for 1963-1964, totaled 2,700,000. Of this number, the Army retained the largest segment, some 975,000, organized into 16 divisions, 5 mechanized, 6 infantry, 3 armored, and 2 airborne. The divisions have been reorganized again from the pentomic system of several years ago, and now operate under a system geared more to conventional war. The most important component of the Army is the Seventh Army, consisting of 240,000 men in 3 mechanized and 3 armored divisions. Stationed in Germany, it is the heart of American strength in Nato. It is being equipped with the M-60 tank, which carries a 105 millimeter gun, and deploys an assortment of tactical nuclear weapons. Six thousand of its men are in Berlin.

Another notable United States Army unit is the Special Forces, troops specially trained

for counterinsurgency operations. Their numbers are being increased from 4 to 6 groups with a total strength of 5,600 men. Finally, approximately 16,000 to 17,000 troops are in South Vietnam.

Army reserves number approximately 650,000, organized into Army Reserve and National Guard units. Six divisions could be provided from these forces within 8 weeks of mobilization, plus 11 brigades and other forces needed to round out the active Army. Two divisions to reinforce Alaska and Panama could be ready in from 4 to 12 weeks. Twenty-one more divisions plus other units would take anywhere from 24 to 36 weeks to be ready.¹

The total strength of the United States Air Force is 865,000. Its most important component is the Strategic Air Command (SAC), which disposes of a force of about 1,300 nuclear armed bombers. This inventory will be reduced to 700 over the next two years as 600 B-47's are phased out. More than 600 B-52's form the backbone of SAC, complemented by two wings of B-58's. Many of these craft can carry missiles as well as bombs. The Defense Department revealed in April, 1964, that 540 strategic or long-range bombers are constantly on alert. SAC also deploys a fleet of 600 KC-135 tankers for refueling bombers in flight and supporting tactical aircraft.

The bulk of United States missile strength is now deployed by the Air Force. One hundred twenty-six *Atlas* missiles are in place, 60 in hardened sites, and 66 in so-called soft sites. These latter are eventually to be phased out. A total of 108 *Titan* missiles were scheduled to have been emplaced in hardened bases by the end of 1963. The *Minuteman* solid fueled missiles are being deployed in even larger quantities, with 180 in place by late 1963, and with the inventory increasing at the rate of 20 a month to a projected total of 800 by mid-1965. In April, 1964, the Defense Depart-

ment reported 750 intercontinental ballistic missiles on launchers.

NORTH AMERICAN AIR DEFENSE

Defense against the intercontinental missile and the strategic bomber is the responsibility of NORAD, the North American Air Defense, based at Colorado Springs. NORAD is a joint United States-Canadian command whose jurisdiction covers the entire continent. The weapons systems it deploys consist of 1,500 fighters, based in both countries, two types of *Bomarc* missiles, and *Nike* batteries designed to furnish anti-aircraft protection to the major urban centers and industrial targets of the United States. The various radar warning systems, including BMEWS (Ballistic Missile Early Warning System), which stretch across Canada, and a space detection and tracking system, all form part of NORAD's armory. But no anti-missile system has been installed, despite large amounts which have been spent studying various alternatives.²

The tactical strength of the United States Air Force is in the process of modernization. One aircraft on order for testing purposes is the F-111, which as the TFX was the target of congressional inquiry. Reconnaissance squadrons are being increased and equipped with a new aircraft, the RF-4C, a reconnaissance version of the new fighter, F-4C Phantom 2.

Finally, the reserve strength of the Air Force numbers 133,000 men. Seventy-two thousand are in the Air National Guard, and the remaining 61,000 in the Air Force Reserve.

The United States Navy, which some commentators feel has been allowed to be devalued in recent years,³ has a total manpower strength of 665,000. The First Fleet is in the Eastern Pacific, the Second in the Atlantic, the Sixth in the Mediterranean, and the Seventh in the Western Pacific. The latter two have been more actively employed than the former in support of United States foreign policy.

The strength in ships of the active fleet is roughly as follows: 15 attack carriers, 11 support carriers, 3 command ships, 12 guided

¹ All figures in this and preceding paragraphs come from *The Military Balance*, 1963-1964. (London: Institute for Strategic Studies, 1963.)

² For further details on NORAD, see *ibid.*, pp. 12-13.

³ See Hanson Baldwin, "The Navy at Ebb Tide," *The Reporter*, January 30, 1964, pp. 35-38.

missile cruisers, 8 light and heavy cruisers, 240 escort vessels, 19 nuclear powered submarines, 86 conventional submarines. This does not include the 250 amphibious ships, some active and some in the reserves, and the 220 minesweepers and 870 service, patrol and other craft which likewise fall under both categories. Over 400 escort vessels and 16 cruisers are definitely kept in the reserve for possible future use.⁴

Naval aircraft number about 7,000, with new types coming into use, while other types already on hand are undergoing modification. Twelve nuclear submarines, with 16 *Polaris* missiles each, are in commission, serving as an essential component of United States deterrent forces.

The Marine Corps, famed as an élite force, maintains a strength of 190,000, divided into 3 divisions and 3 air wings. A fourth division or air wing could be formed from regular Marine forces plus the Marine Corps Reserve. It is planned to expand the Corps' mobility, which has always been its hallmark, by increasing its strength in aircraft. Equipping of the Corps is going forward to permit all divisions to stay in combat for a protracted period.

SOVIET STRENGTH

Just as the armed forces of the United States are the heart and sinew of free world strength, so are those of the Soviet Union the basis of Communist power. Prior to the break between the U.S.S.R. and Communist China the forces of these giants would have had to be coupled in estimating Communist strength *vis-à-vis* the United States. Individually, of course, they are formidable adversaries for this country, and their political division does not destroy the military threat which each poses separately. But there is a kind of cold comfort from the realization that at this juncture, at any rate, their combination against us seems rather unlikely.

The Soviet Army now consists of some 150

divisions and nondivisional support troops, totaling from 2 to 2.3 million men. It is believed that 26 Soviet divisions are stationed in Eastern Europe, 75 in European Russia, 17 divisions in the Far East and 32 in Central Russia. Twenty of the twenty-six divisions in Eastern Europe are in East Germany. There have also been reports that troops from Central Russia have been shifted to the Chinese border areas. These reports may be conjectural, but in the light of recent developments perhaps well founded.

Of the 150 Soviet divisions, approximately half could begin operations without reinforcement, another quarter would require limited reinforcement, and the remainder are simply cadre. Soviet divisions average between 9,000 and 10,000 men,⁵ which represents a reduction from their previous size in line with the presumed conditions imposed by nuclear warfare. But the conventional firepower of these divisions is substantially equal to that of their larger predecessors. In addition, tactical missile units are now integrated into all Soviet formations.⁶ Despite this recognition of the role of tactical missiles, Soviet training emphasizes advance across contaminated ground at something like 60 miles a day. This is in line with Soviet doctrine, which, to a layman, seems to foresee almost the same role for ground forces under the conditions of nuclear war as in the prior conventional state.

The Soviet Navy is now the second largest in the world, with its greatest strength lying in its submarines. Estimates of a few years ago have now leveled off, but it is still believed that Soviet submarines number some 420, with more than 300 of these being of the ocean-going variety. It is now calculated that the Soviets possess 20 nuclear-powered submarines which, if correct, represents a doubling of strength in this category in the past year. At least 30 Soviet submarines are reputed to carry missiles. In April, 1964, the United States Defense Department reported that these missiles have a range of less than 500 miles and must be launched from the surface of the water.

The Soviet surface fleet consists essentially of cruisers, most of them constructed since

⁴ See *The Military Balance*, 1963-1964. *op. cit.*, p. 23.

⁵ See *The Christian Science Monitor*, February 4, 1964, p. 10.

⁶ See *The Military Balance*, *op. cit.*, p. 5.

World War II; destroyers, some of which can fire missiles; and many fast patrol craft, again with a large percentage equipped to fire missiles. The Soviet Navy has no carriers, unlike the United States Navy, which features them. But it does have a land-based Naval Air Force of about 750 planes, most of them bombers based in European Russia.

The fleet air arm is also considered to be part of the Soviet Air Force, and its aircraft are included in the figure of 12,500 which is estimated to be the total Soviet inventory. The Soviet Union maintains a Long-Range Strategic Bomber Force, similar to our SAC, but on a somewhat reduced scale. It is estimated that some 120 heavy bombers and 150 medium bombers could reach the United States and return home after dropping bombs. However, targets would be limited to Alaska and the Northwest. Russia is also very strong in medium or tactical bombers, some 3,000 or more of which range her skies and borders. She has something like 8,000 craft in the fighter interceptor force of the Air Defense Command. Soviet anti-aircraft defenses, highly publicized as the result of the U-2 incident, are supposed to be highly effective.

Although figures do vary from source to source and from time to time, Soviet missile capabilities are considered quite accurately estimated as follows: about 188 operational ICBM's (Intercontinental Ballistic Missiles); 750 medium-range ballistic missiles consisting of two types, one with a range of 700 statute miles, the other with a range of 1,100 statute miles; and an Intermediate Range Ballistic Missile with a range of about 2,100 miles, a force of which is currently being built up.⁷ Like ourselves, the Soviets apparently have no effective anti-missile missile. Personnel in these Soviet Rocket Forces, as they are known, and in the Soviet Air Force, total about 500,000.

This summary of American and Soviet

military strength is of course only part of the story. The strength of Nato *vis-à-vis* that of the Warsaw Pact powers can be more accurately assessed only if we have some knowledge of allied forces on both sides.

NATO STRENGTH

To begin with, Nato is divided into three major commands, Europe, the Atlantic, and the Channel. Allied Command Europe is the most important of these, and the only one vested with operational control of national forces in peacetime. It is subdivided into four area commands, one for Central Europe, one for Northern Europe, one for Southern Europe, and one, largely a naval command, for the Mediterranean.

Nato's Central Europe Command has always been the one on which public attention is focused. It has never met the force goal of 30 divisions, but has now reached a strength of 25 or 26. Of these, 6 are American, 10 are German, 2.33 are British, 2 are French, 2 Belgian, 2 Dutch, and 1 Brigade Group is Canadian. These figures point up the importance of German troops and of the German commitment to Nato. All German troops except a small territorial force are assigned to Nato, and the Germans have now raised eleven of the twelve divisions which they originally pledged. However, the firepower of these German divisions has been rated as below par.⁸

The British Army of the Rhine is under-strength and its equipment has been criticized as out of date.⁹ The two French divisions assigned to Nato are presently still on call, but the somewhat equivocal attitude with which French President Charles de Gaulle views the Alliance suggests that it would not be a matter for the greatest surprise if they were withdrawn.¹⁰ There is no indication of this at the present time, however, and if an attack were to be launched against Nato forces on the Central front the troops there would presumably be reinforced by additional French divisions.

The tactical air forces available to Central Command Europe amount to roughly 3,500 aircraft. An integrated early warning and air

⁷ *Ibid.*, p. 3.

⁸ See *The Christian Science Monitor*, *op. cit.*

⁹ See *Survival*, January-February, 1964, reprint of article from *The Times* of London, p. 37.

¹⁰ The withdrawal on April 28, 1964, of French naval officers from the Mediterranean and English Channel Commands merely serves to underline this point.

defense system covers Britain, West Germany, the Low Countries, and northeastern France, despite an initial French preference for a national system.

The defense of Western Europe's northern region is the responsibility of Allied Forces Northern Europe. Its jurisdiction covers Denmark, Norway, Schleswig-Holstein and the Baltic. All Danish and Norwegian active forces are assigned to its command. These amount to some 85,000 men of all services. One German division is also assigned to this command, as are two combat air wings, and the Germany Navy in the Baltic.

Allied Forces Southern Europe covers Italy, Greece and Turkey. There is more divisional strength assigned to this command than is the case with the other two. Fourteen of Turkey's sixteen divisions are earmarked for Nato, as well as 8 divisions of Greece's 11, and 7 divisions plus some independent brigades from Italy. All the tactical air forces of these three countries operate under AFSOUTH, as it is known. Other divisions would be available in the event of hostilities, as would the United States Sixth Fleet.

Allied Forces Mediterranean has as its chief responsibility the safeguarding of communications in the Mediterranean and around the Black Sea coasts, plus the protection of the United States Sixth Fleet. The fleets of Greece, Turkey and Italy are assigned to this command, together with what maritime air strength they possess, and the British Mediterranean Fleet.

The Allied Command Atlantic is on this side of the water, at Norfolk, Virginia. Its mission includes participation in any strategic strike and the protection of sea communications. It consists essentially of earmarked forces, whether for maneuvers or for actual hostilities, from the eight member nations which border on the Atlantic. Its backbone is the United States Second Fleet, with its two or three attack carriers. In addition, escort vessels, patrol planes, helicopters, and even submarines are available for the anti-

submarine warfare which is expected to be the major responsibility of Atlantic Command if war should ever come to Nato.

Finally, the Channel Command is charged with control of the English Channel and the southern part of the North Sea. Many of the smaller craft of Belgium, the Netherlands, France and Britain are earmarked for this command. Some maritime aircraft are likewise assigned to it.

THE WARSAW PACT NATIONS

Opposed to Nato as a military organization stands the Warsaw Pact. In addition to the Soviet Union, its members are Poland, East Germany, Bulgaria, Rumania, Czechoslovakia, Hungary and Albania, although for all practical purposes the last named has been expelled from the club. Poland, whose armed forces total 257,000, has an army of 200,000 organized in 14 divisions. It is considered to be an effective force. Bulgaria maintains an army of 110,000, Czechoslovakia one of 150,000. East Germany is often popularly thought of as having the best satellite force, but it is probably less efficient than those of Poland and Bulgaria. Its army numbers 90,000. Rumanian forces total 227,000, with 200,000 of these in the army. Hungary's army numbers 90,000, and Albania's 25,000.¹¹ All the regular armed forces of the Communist countries are supplemented, it must be remembered, by sizable paramilitary forces, some of which may be fairly effective.

Comparing Nato forces with those of the Warsaw Pact leads to some interesting conclusions. In November, 1963, United States Secretary of Defense Robert McNamara put the total of Soviet forces at 3.3 million, 2 million of these being ground troops. Other Warsaw Pact members could augment this ground force figure to a total of 3 million, and all Communist forces in Europe were put at 4.5 million. Against this, Nato deploys a total strength of about 5 million, with ground forces amounting to 3.2 million, of which 2.2 million are stationed in the strategic centers of Europe. The Institute of Strategic Studies, which has been quoted often in this article, has reported that the total service manpower

¹¹ All estimates of Warsaw Pact forces drawn from *The Military Balance*, 1963-1964, *op. cit.*, pp. 7-9.

¹² See *The Christian Science Monitor*, *op. cit.*

for the Western alliance is 7.92 million, compared with 7.52 million for the Communist bloc, including Communist China.

European military sources have estimated Nato strength in Western Europe at 1.4 million, but believe it could quickly be increased to more than 3 million with reinforcements rushed in from Italy, Greece, Turkey and the United States.¹² Operation Big Lift, in which the United States flew a full division to Europe in less than three days, may have strengthened their views in this connection, although one may question whether the conditions of Big Lift could be duplicated in wartime.

CENTO AND SEATO POWERS

Before summarizing the forces of Communist China, let us glance at Cento and Seato, two anti-Communist alliance systems. Cento (the Central Treaty Organization) consists of Turkey, Iran, Pakistan, and Great Britain. The first and last of these are also members of Nato, and their military strength is available to Nato in the first instance. Pakistan has an army of 230,000 and Iran one of 200,000. But what these may represent in real strength is questionable. Pakistan's army is composed of traditionally effective fighting men, but Pakistan has displayed increasing disenchantment with United States aid to India, and an increasing closeness to Peking. This hardly portends well for the future of the organization. Iran's army has never been tested under conditions of modern warfare. Actually, Cento does not have an international command set-up, nor are forces directly allocated to it. Rather, it is administered through a loose Coordinating Council of Military Deputies, plus attendant economic and counter-subversion committees.

Seato (the Southeast Asia Treaty Organization) is also somewhat loosely structured. Its members are Australia, New Zealand, Pakistan, the Philippines, France, Thailand, the United Kingdom, and the United States. The United States supports Seato through the Seventh Fleet, and by means of American air

and ground forces in Guam and Okinawa. A Commonwealth Brigade (drawn from Britain, Australia and New Zealand) plus supporting air units based in Malaysia and certain British naval units also based there are committed to the support of the treaty. Australia's total military strength consists of some 50,700 men, that of New Zealand some 12,000, the Philippines 30,000, and Thailand 90,000. France commits no forces in direct support of Seato.

Of the unaligned states, India's armed forces total 585,000, those of Indonesia 375,000, Sweden 80,000, Switzerland 28,500, and Yugoslavia 300,000. Of the states which have mutual defense treaties with the United States, the Japanese armed forces total 243,000, those of South Korea 627,000, and those of the Chinese Nationalists 544,000.¹³

COMMUNIST CHINA'S STRENGTH

Finally there is the brooding omnipresence of Communist China. Its armed forces total roughly 2,475,000 to 2,500,000. Roughly 2.25 million of these are in the army, which consists of 120 divisions. The navy numbers 136,000 including marines, and the air force some 90,000.

In addition to these forces, the Communist Chinese maintain a huge militia, but it is used as much for labor as for defense. There is also a Public Security Force of some 300,000.

Communist China's chief deficiencies lie in equipment. Its tanks are obsolete, and its latest combat aircraft are MIG 19's, which are older than a number of the aircraft possessed by some of the East European satellites. From time to time in the past, the

(Continued on page 51)

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¹³ See *The Military Balance*, *op. cit.*, pp. 24, 25, 28.

"A disarmed world is not possible without the abolition of biological and chemical weapons," writes this specialist. Yet until the complex control problems are resolved, "nations are likely to continue their efforts to develop stockpiles of B.C.W."

Biological and Chemical Weapons

By ROBERT L. PFALTZGRAFF, JR.

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MOST STUDIES of disarmament and arms control since World War II have examined the problems of limiting or preventing the use of nuclear weapons. In the years following World War I, however, statesmen sought to remove capabilities for biological and chemical warfare from the arsenal of national power. Just as political leaders since 1945 have retained images in their minds of the nuclear destruction of Hiroshima and Nagasaki, so their predecessors a generation earlier recalled the use of chemicals against troops in the trenches of the Western Front. After both wars, efforts to regulate weapons were directly related to wartime experiences. The dearth of current proposals related to biological and chemical warfare can probably be attributed to the fact that both protagonists refrained from the use of such weapons during World War II.

Our preoccupation with nuclear warfare notwithstanding, both the Soviet Union and the United States have developed considerable capabilities for conducting biological and chemical warfare. Marshal G. K. Zhukov, when he was Soviet Minister of Defense, in-

formed the Twentieth Party Congress in February, 1956, that Soviet armed forces were prepared to use biological and chemical weapons (B.C.W.) in war. According to Zhukov,

A future war, should it be unleashed, will be characterized by the massive use of air forces, various rocket weapons, and various means of mass destruction such as atomic, thermonuclear, chemical, and bacteriological weapons.¹

Marshal Sokolovskii, in the most recent Soviet treatise on military strategy, does not rule out the possibility of using biological and chemical weapons in a future conflict.

In particular, in a future war one may expect the employment of chemical and bacteriological weapons to whose development great significance is accorded in the Western countries, particularly the United States.²

Moreover, the Soviet Union has given emphasis to biological and chemical weapons in its preparations for civil defense.³ One may infer that the Soviets, having noted Western capabilities in biological and chemical weaponry, are prepared, if necessary, to use such weapons.

The United States has also developed biological and chemical weapons. The United States Army Chemical Corps is charged with the task of examining possible conflict situations in which such weaponry might be used. The Chemical Corps has contracted with universities, scientific institutions, and industrial firms for research and development of biological and chemical weapons. Nevertheless,

¹ See *Current Digest of the Soviet Press*, Vol. 8, No. 10 (April 18, 1956), p. 11.

² V. D. Sokolovskii, ed., *Soviet Military Strategy*, translated by Herbert S. Dinerstein, Leon Gouré and Thomas W. Wolfe. A RAND Corporation Research Study (Englewood Cliffs, New Jersey: Prentice-Hall, 1963), p. 337.

³ See Leon Gouré, *Civil Defense in the Soviet Union* (Berkeley and Los Angeles: University of California Press, 1962), pp. 12-13.

United States official policy on the use of biological and chemical weapons has not altered since President Franklin Roosevelt's statement of June 8, 1943, when he declared:

I have been loath to believe that any nation, even our present enemies, could or would be willing to loose upon mankind such terrible and inhumane weapons. . . . Use of such weapons has been outlawed by the general opinion of civilized mankind. This country has not used them, and I hope that we will never be compelled to use them.⁴

Americans remain reluctant to contemplate the use of B.C.W.

USE OF B.C.W.

Although usually considered together, biological and chemical weapons differ from one another. Biological warfare consists of the use of living organisms, toxic biological products and chemical plant regulators against humans, plants and animals. Chemical warfare comprises toxic agents, such as gases, which produce casualties when inhaled or placed otherwise in contact with the human body. Biological and chemical weapons may be used either to kill human beings or to produce temporary incapacitation, including blindness, deafness or impairment of a person's mental faculties. Biological and chemical weapons could be employed in a strategic attack designed either to kill or to injure an enemy's population. Forms of B.C.W. might be used against crops in order to destroy a country's agricultural trade or food supplies. They could be employed in counterinsurgency operations, as they have been in South Vietnam to destroy foliage along highways near which guerrilla fighters lie in ambush awaiting convoys and other vehicles. Thus biological and chemical weapons, lethal and non-lethal, have a wide variety of uses against humans,

animals and crops in strategic and tactical operation.

B.C.W. AND INTERNATIONAL LAW

During World War I, the use of chemical warfare on the Western Front in 1915 produced a revulsion against this form of weaponry. This, in turn, led to efforts in the interwar period to remove B.C.W. from the arsenal available to nation-states. Earlier, students of international law, most notably Hugo Grotius, had sought to prevent the use of poisons for military purposes.⁵ The Hague Convention of 1899 prohibited the use "of projectiles the sole object of which is the diffusion of asphyxiating or deleterious gases." This Convention, although not ratified by the United States, received the signatures of 25 other nations, including Germany, France, Russia, Great Britain and Austria-Hungary.

The Treaty of Versailles, signed June 28, 1919, prohibited the use of gases in warfare. Perhaps the most notable of the interwar efforts to outlaw B.C.W., however, is to be found in the Geneva Protocol, signed June 17, 1925, by 46 countries, including the United States. The signatories declared that

whereas the use in war of asphyxiating, poisonous or other gases, and of all analogous liquids, materials or devices, has been justly condemned by the general opinion of the civilized world . . . the high Contracting Parties . . . agree to extend their prohibition to the use of bacteriological methods of warfare and agree to be bound as between themselves according to the terms of this declaration.⁶

The United States and Japan, together with four other signatories, did not ratify the Geneva Protocol which, nevertheless, came into effect on February 8, 1928, since it did not require unanimous ratification. By the outbreak of World War II, 42 nations had completed ratification of the Geneva Protocol.⁷ Sixteen of these nations had specified that they considered themselves bound only with regard to other states who had adhered to the Protocol. Nineteen nations, including the aforementioned, reserved the right to employ B.C.W. in defense against an enemy which used them first.

In arms control and disarmament negotia-

⁴ See *The New York Times*, June 9, 1943.

⁵ See Hugo Grotius, *De Jure Belli ac Pacis*, 1625. Translated by Francis W. Kelsey (Oxford: Clarendon Press, 1925), III, pp. 651-652.

⁶ United States Department of State, *Papers Relating to the Foreign Relations of the United States*, 1925 (Washington: U.S. Government Printing Office, 1940), Vol. 1, pp. 89-90.

⁷ See Theodore Rosebury, "Some Historical Considerations" ("Symposium on Biological and Chemical Warfare,") *Bulletin of the Atomic Scientists*, Vol. XVI, June, 1960, p. 232.

tions since World War II, B.C.W. have received but occasional mention and have often been considered under the general category "weapons of mass destruction." In the post-war period the United States became increasingly unwilling to accept treaties restricting armaments if they represented only declaratory policies without embodying the principle of adequate inspection. Perhaps for this reason, President Harry Truman in 1947 withdrew the Geneva Protocol from consideration by the Senate. When the Chinese Communists launched their propaganda campaign charging the United States with having used "germ warfare" during the Korean War, the United States delegate to the United Nations declared that:

If every member of the United Nations were to sign the 1925 protocol this morning, this afternoon the Soviet Union, having already hurled the lie about U.N. use of bacteriological warfare in Korea, would be free, under its reservation to the protocol, to use such warfare against any U.N. member. It is obvious that there is no security at all in an arrangement such as this.⁸

United States policy, therefore, has stressed the maintenance of freedom, in the absence of arms control agreements with adequate schemes for inspection, to develop biological and chemical weapons for national defense. The United States government has opposed in principle House Concurrent Resolution 433, sponsored by Congressman Robert Kastenmeier, which had as its objective to commit the United States publicly to a no-first use of B.C.W.

In the Defense and State Departments,

⁸ Benjamin V. Cohen, Statement in U.N. Disarmament Commission on May 27, 1952. *Department of State Bulletin*, Vol. XXVI, No. 676 (June 9, 1952), p. 912.

⁹ Quoted in *Chemical-Biological-Radiological (CBR) Warfare and Its Disarmament Aspects*. A study prepared by the Subcommittee on Disarmament of the Committee on Foreign Relations, United States Senate (Washington: U.S. Government Printing Office, 1960), pp. 21-22.

¹⁰ See *Documents on Disarmament 1945-59*, Department of State Publication 7008 (Washington: U.S. Government Printing Office, 1960), Vol. II, p. 1451.

¹¹ *Ibid.*, pp. 1470-1472.

¹² See James E. Dougherty, *B/C Weapons and Arms Control*. Background paper for the Third Strategy for Peace Conference, Airlie, Virginia, October 19-22, 1961, p. 49.

letters opposing the Kastenmeier resolution declared that B.C.W. should not be singled out for special condemnation among weapons systems. Whether or not the United States should use biological and chemical weapons was a decision to be taken

at the highest levels of Government in the light of the Nation's longstanding policies and principles, its international obligations, and the emergent situations it will confront. Effective controls on biological and chemical weapons, as in the case of other weapons, may have to await international agreements with necessary safeguards.⁹

Thus United States policy with respect to B.C.W. remains one of probable non-use unless an opponent strikes first with them. However, the United States has refrained from committing itself in advance not to initiate the use of biological and chemical weapons, fearing, perhaps, that the occasion might arise when such arms would provide the only means available for victory.

In Soviet and Western proposals for general and complete disarmament the problem of B.C.W. has not been ignored. The British draft plan, submitted to the General Assembly in September, 1959, stipulated that in the third stage of disarmament the manufacture and use of biological and chemical weapons would be prohibited.¹⁰ The Soviet plan, placed before the General Assembly in the same month, provided for "prohibition of the production, possession and storage of the means of chemical and bacteriological warfare, and destruction of stockpiles of these types of weapons . . . under international supervision."¹¹ The Soviet plan, like the British, would have eliminated B.C.W. during the third and final stage of a transitional period from an armed to a disarmed world.

The United States has expressed its agreement with this principle. A Western plan submitted to the Ten-Nation Committee on March 15, 1960, called for the prohibition of B.C.W. in the third stage of an arms control agreement. Other Soviet and Western proposals have contained general provisions for the reduction or prohibition of B.C.W. in the second stage of an arms control agreement.¹²

There is a consensus, expressed in East-West proposals, that B.C.W. should be subject to control. However, neither the Soviets, nor the United States and its allies, have come to grips with the formidable technical problems which would accompany an agreement to reduce or prohibit biological and chemical weapons. Disarmament discussions apparently have not gone beyond the stage of proposals for limitations upon B.C.W.

NO SINGLE SYSTEM

Even if agreements could be concluded for the reduction or abolition of nuclear weapons, there would remain a biological and chemical capability of considerable dimensions. The major powers could inflict upon each other casualties of a magnitude similar to a nuclear war. Hence the problems of B.C.W. and nuclear weapons cannot be treated in isolation. The possibility of destruction by biological and chemical weapons points to the unity of the arms control problem. The abolition of no single system of armaments is likely to produce a peaceful world. If men do not have nuclear weapons, they may fight with biological and chemical weapons. A variety of armaments remains at the disposal of nations bent upon conflict.

Proposals for the international control of armaments have generally included several features: reductions in force levels to render difficult, if not impossible, an attack by one country against another; limitations upon delivery systems; the creation of procedures for international control; inspection to police agreements; and the building of machinery for punishing aggressors and keeping the peace by separating protagonists in a future conflict. The control of biological and chemical weapons would pose numerous technical problems in disarmament agreements embodying above-mentioned features.

Of all weapons systems, B.C.W. probably promises the potential user the greatest flexibility in terms of delivery systems at the present time. A power which wishes to employ

nuclear weapons today needs sophisticated delivery systems—manned aircraft, nuclear submarines, also surface ships and missiles. Eventually, the means of delivering atomic weapons will increase. Devices which may be carried in a suitcase and deposited in a target area will be developed. Major powers, moreover, may soon have at their disposal delivery systems capable of launching nuclear weapons from space platforms orbiting the earth.

Means available for the delivery of nuclear devices can also be utilized to direct biological and chemical weapons to their targets. Missiles capable of striking targets in the Soviet Union from the United States can be equipped with warheads bearing biological or chemical agents. Aircraft could be employed to spray biological and chemical substances over target areas. It might be technically possible, for example, to equip as few as ten planes or missiles with biological agents. These vehicles could fly at high altitudes and disperse their contents, inflicting casualties upon at least 30 percent of the population of the United States.¹³

In fact, fewer vehicles are required to deliver biological and chemical weapons than would be the case with nuclear devices of equivalent destructive power. A saboteur posing as a tourist could carry B.C.W. into a country. Balloons could provide delivery vehicles for B.C.W. Commercial aircraft and vessels could probably disseminate biological and chemical weapons with less difficulty than these vehicles could deliver nuclear devices. Thus the technical problem of limiting national delivery capabilities for B.C.W. appears to be greater even than that posed by nuclear weapons by virtue of the variety of means for delivering biological and chemical devices to their targets. To insure against the delivery of B.C.W. in a disarmed world might prove impossible because of the many delivery systems available to the potential user.

The question of inspection presents formidable technical problems for the control of biological and chemical weapons. These problems, in turn, are related to the survey and reduction of existing stockpiles, the examination of facilities for research and development,

¹³ See *Chemical-Biological-Radiological (CBR) Warfare and Its Disarmament Aspects*, op. cit., p. 32.

the testing and production of B.C.W. Presumably, the inspection of national capabilities for biological and chemical weapons might include the international registration of scientific personnel, procedures for materials accounting in order to ascertain the levels of production of biological and chemical materials, fiscal controls to determine national expenditures for B.C.W., and physical inspection of a country's territory to assure against clandestine stockpiling.

TECHNICAL DIFFICULTIES

A disarmed world is not possible without the destruction of biological and chemical weapons. Yet the technical problems of prohibiting such armaments are far greater than those which arise with respect to atomic warfare. This fact did not escape the attention of participants in the Fifth Pugwash Conference, which was held in Nova Scotia in August, 1959. The report issued after this meeting stated: "However difficult the international control of atomic weapons may be, the international control of biological and chemical weapons by any system of inspection seems incomparably more difficult."¹⁴ Three categories of problems give substance to the apprehensions expressed by the Pugwash scientists with respect to controlling B.C.W.: the regulation and prevention of research and development, testing, and the clandestine stockpiling of biological weapons. It is necessary to resolve each of these problems before nations will be willing to disarm.

Programs of research and development for B.C.W. are less conspicuous than is the case with respect to nuclear armaments. It is possible, for example, to conduct a variety of experiments in biological and chemical warfare in hundreds of university, governmental,

and company laboratories. There are some 11,000 firms in the United States which produce chemicals, together with many other companies whose facilities could conceivably be used for this purpose.¹⁵ A variety of experiments on B.C. agents could be conducted in widely scattered laboratories. Moreover, much of the experimentation for B.C.W. is indistinguishable from that undertaken in peacetime programs for public health, agriculture, and chemistry.¹⁶ Hence the problem of inspection in research and development is compounded by the relationship which exists between B.C.W. and other experimentation. Last but not least, problems are likely to arise with respect to industrial espionage. Companies are reluctant to permit outsiders to inspect their programs of research and development, especially if they risk the possibility of passing secrets to competitors. In brief, an inspection team might be unable to detect a program of research and development for biological and chemical weapons.

Fiscal controls, it has been suggested, might furnish a means of detecting armament programs which violated disarmament agreements. In a disarmed world, fiscal inspectors would have access to the financial records of governmental agencies. Unexplained and sizable changes in budgets would arouse the suspicions of the inspection teams. The inspectors, in turn, would seek to determine the nature of the expenditure under scrutiny. Presumably, they would detect expenditures for weapons.

This kind of inspection is probably inadequate for discovering violations of agreements on even nuclear weapons. True figures for armaments may be disguised by including them in budgets other than those for the military establishment. Such has been the case, for example, with the Central Intelligence Agency, whose expenditures are not readily available. In a disarmed world, appropriations for armaments would be lower than today. The military capability necessary for a nation to achieve a margin of superiority *vis-à-vis* its neighbors would be smaller than in an armed world. Hence the possibilities for concealing, under other categories, appro-

¹⁴ See "On Biological and Chemical Warfare," *Bulletin of the Atomic Scientists*, Vol. XV, No. 8 (October, 1959), p. 339.

¹⁵ See *Chemical-Biological-Radiological (CBR) Warfare and Its Disarmament Aspects*, *op. cit.*, p. 32.

¹⁶ See Vincent Groupé, "On the Feasibility of Control of Biological Warfare," in Seymour Melman (ed.), *Inspection for Disarmament* (New York: Columbia University Press, 1958), pp. 186-187.

priations for prohibited weapons would be considerable. Research and development for B.C.W. and for their production is less costly than that for nuclear weapons. Thus if fiscal inspection poses problems for nuclear disarmament, it is even less likely to provide a satisfactory solution for the reduction and abolition of biological and chemical weapons.

Other forms of inspection for the control of research and development for B.C.W. include materials accounting and the registration of scientific personnel. Under such schemes the amounts of certain materials crucial to the production of biological and chemical weapons would be registered with an international agency or made available in other ways to nations desiring access to them. Inspectors might visit nations which reported substantial increases in the production of such materials in order to ascertain the uses to which they were put. However, because of the production of a wide variety of biological and chemical substances, usable both for peacetime and military purposes, a country might easily disguise the production of such materials. A power desiring to undertake research and development in B.C.W. could probably escape detection by simply failing to report increases in the production of key biological and chemical materials. The manufacture of the components of B.C.W. in hundreds of laboratories could render impossible discovery by an inspection team of a violation in an arms control agreement prohibiting biological and chemical weapons.

Similar problems confront the registration of scientific personnel as a means for preventing the clandestine research and development of B.C.W. Presumably, lists containing the names and occupations of scientists and technicians would be deposited with an international inspectorate. Governments bent on violating such an arrangement could train a research staff whose names would not appear on the list submitted to the policing agency. Scientists registered on such lists might perform part-time, or even full-time, work on military projects. There would be little likelihood of their detection by an inspection team in a country employing millions of scientific

personnel on a variety of projects. Moreover, a problem which confronts inspectors in other phases of inspection is present in the registration of scientific personnel: the similarity between research for military and peacetime purposes. It would probably be impossible for an inspection team to distinguish between such research.

A second category of inspection consists of the policing of agreements for the abolition of testing and production. As in the case of nuclear weapons, such agreements are probably more easily administered than are restrictions upon research and development. A nation wishing to test and produce B.C.W. must have at its disposal facilities larger than those needed for conducting research. The more extensive the physical plant necessary for production, the more difficult becomes the problem of concealment from international inspection.

The problem of testing biological and chemical weapons would pose additional obstacles for the potential violator of an arms control agreement. It might be necessary to test certain new weapons in order to assure their operation under conditions of battle. Presumably, the simulation of wartime conditions would require nations to set aside large areas for programs of testing. A nation might find difficulty in restricting travel to a region where tests were to be conducted without arousing suspicions. Moreover, the risk might exist that diseases from weapons being tested would spread beyond the testing area.

It remains uncertain, however, whether a nation bent upon using B.C.W. would embark upon a program of testing in order to develop such a capability. Available knowledge about biological and chemical weapons may be adequate for the preparation of B.C.W. without testing. In a disarmed world a nation with even a rudimentary B.C.W. capability could probably inflict heavy casualties upon its enemies. A power might produce biological and chemical weapons similar to those with which its scientists were already familiar, before the signing of an arms control agreement, without incurring the suspicions which inhere in a program of testing.

STOCKPILING PROBLEMS

Stockpiling poses perhaps the most formidable technical problem of disarmament. It is possible for a nation to conceal substantial quantities of nuclear weapons. The United States has no assurance that after signing a disarmament agreement the Soviet Union could not conceal nuclear weapons in sufficient quantities to achieve eventual military supremacy. We might one day confront a power which, during an international crisis, suddenly "discovered" armaments supposedly destroyed under international agreement. Nations would have at least two incentives to conceal stockpiles of nuclear or biological and chemical weapons: to guard against an adversary who might have done the same, and to become the dominant power in a world in which other nations have disarmed.

The United States, because it lacks data about the precise size of the Soviet military stockpile, has no way of determining with accuracy if the Soviets have, in fact, complied with an agreement for disarmament by reducing or destroying weapons. A margin of error ranging between estimates of ten and twenty per cent exists in our calculations of Soviet nuclear power. There is probably less accurate information available about Soviet B.C.W. stockpiles. Because of such margins of error, the Soviets could retain a residual nuclear or biological and chemical capability after arms reductions following disarmament agreement.

The experience of the Western European Union (W.E.U.) illustrates the problem of international control with respect to biological and chemical weapons. The Agency for the Control of Armaments in W.E.U. was charged with the task of examining statistical and budgetary information and making inspection tours of plants and military depots in the territories of its members on the Continent. The principal objective of this agency was to safeguard against the production of atomic,

biological and chemical weapons by the Federal German Republic. Other members agreed that when "effective production" of these weapons had begun on their territory, they would subject themselves to inspection by W.E.U. Thus far, however, France has not given her approval to such inspection. Moreover, notice of several weeks must be given before a W.E.U. inspection team can gain access to a factory or military installation.

The experience of the Armaments Control Agency has been largely disappointing and the lessons to be drawn from it are largely negative. It has dedicated, efficient servants, and they have acquired a great deal of valuable experience in cross-checking budgetary information and other data. But political considerations have prevented them from widening their experiences. Little has been learned, for example, about techniques of physical inspection and control that would be useful in training those who will one day have to police a general and comprehensive disarmament agreement.¹⁷

Thus W.E.U. has not succeeded in subjecting its members to an effective system of international inspection. Even friendly powers apparently are reluctant to permit an international inspectorate unimpeded access to their territory.

Since the end of World War II, the problem of inspection has preoccupied arms control planners and negotiators precisely because of the destructive potential of weaponry. A few nuclear weapons contain the destructive potential of all bombs used during World War II. A small nuclear capability hidden in caves might be sufficient to enable the possessor nation to prevail in a disarmed world. Such a cache is difficult, if not im-

(Continued on page 51)

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¹⁷ See Raymond Fletcher, "Existing Arrangements for International Control of Warlike Material in Western European Union," *Disarmament and Arms Control*, U.M.I., Autumn, 1963, pp. 151-152.

Discussing the forces in action in attempting to control conventional weapons, among others, this writer points out that "There is a two-way relationship between technical and political factors which centers around the problem of verification of arms control agreements. As technical aspects grow more complicated, verification becomes more difficult. As verification becomes more difficult, the need for political willingness is greater."

Conventional Weapons Control

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ARMS CONTROL is an attempt to reduce in various ways the likelihood, or to moderate the effects, of military conflict. Disarmament is an attempt to accomplish this by depriving nations of some or all of the arms needed to fight other nations. In the general literature of arms control, however, the distinction is not always made. Further, for the purposes of this study, a conventional weapon is defined as any non-nuclear weapon.

During the 100-year period between Waterloo and World War I, European statesmen were able to keep their wars under control through traditional diplomatic means, helped by the fact that the resources available for warmaking were limited, by modern standards. No arms control agreements in Europe were actually put into effect during that period, though several were discussed.¹

However an agreement was made, in this interval, between the United States and Great Britain to limit naval forces on the Great Lakes and Lake Champlain. This was the Rush-Bagot Agreement of 1817. The political setting was close to ideal, because both nations saw a long-term advantage in avoiding a naval arms race. In addition, at that time technical matters were no obstacle. The

agreement covered only one form of power, naval power, which was uncomplicated and easily measured. A secret buildup would have been extremely difficult to conceal because of the open borders and freedom of movement between the two countries. At no time since, have the political and technical conditions for an arms control agreement between major powers been so favorable.

During the last half of the nineteenth century, modern industrial-technological methods caused a revolution in military power. Military technology advanced faster in those years than it had in several preceding centuries. Few people were able to foresee the effects of this advance on land and naval warfare. During this half century, sail was replaced by steam power in ships, iron hulls replaced wooden hulls, breech loading cannon were perfected; breech loading high velocity repeating rifles, the machine gun, smokeless powder, toxic gas, the underwater self-propelled torpedo and the submarine all made their appearance. Other inventions with obvious military value were the wireless and the internal combustion engine. In fact, the great industrial-economic growth of the Western nations inevitably added to their warmaking capacity.

As it happened this technological outpouring complicated the problem of arms control

¹ See Merze Tate, *The Disarmament Illusion* (New York: The Macmillan Company, 1942), p. 8, ff.

at a time when the political aspect was also becoming more difficult. Nationalism was breaking down the old sense of international camaraderie among European leaders. The nations of Europe were growing powerful; their industry and overseas possessions contributed to an unstable balance of power. Population growth increased the supply of military manpower.

At the two international conferences on the regulation of arms held at The Hague in 1899 and 1907, the major powers paid lipservice to the need for arms limitation, but were generally unwilling to engage in serious negotiation. It took World War I to create a more serious interest in arms control among the major powers. But as the political conditions improved (temporarily during the 1920's) the technical problems proved to be extremely difficult.

MAJOR METHODS OF ARMS CONTROL

Arms control efforts since World War I can be placed under three general headings: 1) control of the resources and production of military forces; 2) control of the forces in being; 3) control of the deployment of the forces in being. From a technical standpoint the first approach is probably the most difficult and the third the least.

Control of resources and production. Theoretically the most simple and direct approach to arms control would be a limitation on armament budgets. The drawback is that a budget limitation would work unevenly. This was pointed out during the deliberations of the League of Nations Preparatory Commission, which explored the various forms of arms control between 1926 and 1930.² Some nations are able to get more military force out

of a given amount of money than others. The United States, for example, has higher overhead costs because of higher rates of pay for personnel and a greater dependence upon expensive equipment.

Added to the problem of uneven effect is that of verification. Nations with large complex annual budgets can hide military expenditures in a number of ways. The larger the budget, the more difficult is detection.³ The military budget reduction itself would be difficult to verify. And, in the event of an agreed reduction, it still would not be certain that a refusal to reduce military procurement correspondingly could be detected, even if the inspectors had complete access to the books of each government agency.⁴ For example, the expense for designing and building the new American A-11 supersonic plane never appeared in the annual defense procurement budgets. And so we see that budgetary limitation by itself, without alternative means of cross-checking, is not a promising form of arms control.

One of the main approaches to nuclear arms control has been the control of production resources. This is a promising method for the control of nuclear weapons because of the limited and highly specialized facilities and materials involved. For conventional weapons, however, this is not the case. Many non-military facets of a modern nation's economy can contribute to conventional military power—things such as industrial plant, roads, railways, air transport, merchant marine, raw materials.

It might be feasible, however, to control certain key elements contributing to conventional military power. The United States offered a working paper to the now defunct United Nations Commission for Conventional Armaments (1947-1952) entitled "Industrial Safeguards—Safeguards through Industrial Inspection."⁵ It was suggested that by checking certain key industries it would be possible to monitor arms procurement. The United States made a study of its own iron and steel industry.⁶ An advantage of this approach is that it would not necessarily require probing into sensitive military programs. But it could

² See Merze Tate, *The United States and Armaments* (Cambridge: Harvard University Press, 1948), pp. 86-87.

³ See Jesse Burkhead, "The Control of Disarmament by Fiscal Inspection," in *Inspection For Disarmament*, edited by Seymour Melman (New York: Columbia University Press, 1958), p. 75 ff.

⁴ *Ibid.*, p. 78.

⁵ See Bernhard G. Bechhoefer, *Postwar Negotiations for Arms Control* (Washington, D. C.: The Brookings Institution, 1961), p. 142.

⁶ *Ibid.*

not be sufficient by itself. There would have to be some method of checking not only at the production source, but also at the place of delivery. Some form of manufacturing plant inspection would be required.

Control of forces in being. Two basic technical problems are connected with the control of forces in being, not counting verification. They are as prominent today as they were in the 1920's when Philip J. Noel Baker wrote, "These technical problems, it may once more be repeated, are two. What factors of military strength shall be dealt with? How can these factors be so combined as to permit comparison between the strength of different states?"⁷

A distinction is usually made between quantitative and qualitative changes in forces in being. Quantitative refers to a reduction in the size of forces, or number of individual units, and qualitative refers to reduction or elimination of certain types of forces. Most arms control plans include both quantitative and qualitative changes.

The first serious multilateral attempt to reduce armaments came after World War I when the United States, England, Japan, France and Italy took part in the Washington Conference on the Limitation of Armament of 1921. It was mainly concerned with forestalling a costly naval building race which was just getting under way.

Agreement was reached on the number and size of capital ships (battleships) that each nation could maintain in accordance with a 5-5-3-1.67-1.67 tonnage ratio for the United States, Britain, Japan, France and Italy respectively.⁸ Since the ships afloat and those under construction or planned were known from the start, the main technical problem was to decide what specific combinations of ships for each nation would meet the ratio.

Except for an agreed limitation on aircraft carriers, attempts to limit other types of naval craft failed. Great Britain wanted to abolish

the submarine. The United States wanted the 5-5-3 ratio to apply to all classes of ships. But the treaty had no effect on cruisers, destroyers or submarines, and naval building continued to increase.

When later conferences attempted to deal with the whole range of naval forces it was much more difficult because of the technical complexity of measuring relative power. Many other factors had to be considered, such as the number of men in the merchant marine capable of doing military duty, the possibility of converting merchant vessels to military purposes, which had been done extensively in World War I, whether to figure gross tonnage or tonnage of different types separately, how to figure the value of naval bases and coaling stations, whether geographic factors should be taken into consideration.

The United States and Great Britain were agreed on a system of limitation by categories. And the United States was willing to recognize the special strategic requirements that Britain had to meet for protection of the sea routes to the Empire. Nevertheless the two countries found it impossible to settle on a "yardstick" for determining the relative strength in cruisers while still preserving naval "parity" between them.

At the London Naval Conference of 1930, the naval experts were unable to agree. A settlement was reached because of the determination of political leaders.

All the arguments and counter arguments over equality seemed to prove that actual parity between navies so differently situated as were the American and British, was utterly impossible of attainment.⁹

When the subject of reducing armies had come up earlier in the League Preparatory Commission there was a basic disagreement over whether to restrict the number of trained reserves as well as the men on active duty. The problem of measuring manpower strength involved such questions as the length of service for individuals, and the status of paramilitary and security forces.

Prior to World War II, private companies which manufactured armaments were able to supply modern weapons to countries that

⁷ Philip J. Noel Baker, *Disarmament* (London: Hogarth Press, 1926), p. 130.

⁸ Delegates to the Washington Conference signed this agreement on February 6, 1922; it was subsequently ratified by the five powers.

⁹ Tate, *The United States and Armaments*, p. 184.

could not produce them on their own. Today, governments have become the principle suppliers of arms to other countries. Thus an arms control agreement calling for the destruction of weapons would not only affect the parties to the agreement, but also their potential customers, especially if the plan included surplus and obsolescent weapons on the list to be destroyed. The American proposal for the United States and Russia to destroy a like number of obsolescent jet bombers with roughly the same performance would reduce the number of planes that could eventually fall into the hands of other countries. The Soviet nine-point program presented in January of 1964, at the Geneva 17-Nation Disarmament Committee Conference,¹⁰ included a proposal to eliminate all bomber aircraft in the world.

Since World War II, there has been less emphasis on the technical factors of measurement, or on the definition of categories, because of the inability to reach prior agreement on verification. Technical studies have been made, but seldom used in negotiations.¹¹

The ever-changing character of military technology is another difficulty in the way of arms control. There has always been a fear of falling behind in some important new development. Continued armament research and development becomes a form of national insurance.

With the advent of the nuclear age, the qualitative competition in conventional arms has declined and it is doubtful that there will ever be a period of development comparable to that of 1860-1914. Even so, a large power today would probably be unwilling to accept an arms limitation agreement that ruled out the further application of guided weapon technology to conventional warfare. Missile technology could have as great an effect on conventional warfare as did the tank and the airplane.

Deployment of forces. The limitation of arms in certain geographic areas does not

necessarily limit the sources of arms production or the forces in being. The purpose of demilitarized zones is not only to make calculated attack more difficult, but also to reduce the dangers inherent in an unexpected crisis in which opposing forces are close to each other.

Demilitarized zones have taken various forms in the past. The Great Lakes border area between the United States and Canada was effectively demilitarized by the earlier mentioned Rush-Bagot agreement. Belgium served as a neutral zone in Europe during a period of general European armament rivalry. However, when the Germans violated Belgian neutrality in 1914, the military weakness of Belgium was an important advantage for the aggressor. Nonetheless, hostile powers have often been separated by demilitarized zones. After World War I, the German Rhineland area on the French border was demilitarized and arms restrictions were placed on all of Germany.

The technical problems of demilitarized zones are mainly those of verification. There is also the tactical question of balance, or how to devise a plan that will not work to the military advantage of one side over the other. It is feared, for example, that a demilitarized zone in Central Europe would only set back the defense line of the West without greatly reducing the difficulty of an attack from the East.

Modern forces with their greater speed, range, mobility, and air power have somewhat diminished the effectiveness of fully demilitarized zones in preventing deliberate aggression or intervention. But they can help to insure against spontaneous clashes.

THE PROBLEM OF VERIFICATION

Verification has two related functions. One is to see that an arms control agreement is honored, the other is to reduce the possibility of surprise attack.

In the deliberations on arms control during the 1920's, the problem of verification was less prominent than it is today. Prior to World War I, Germany had been an outspoken opponent of international schemes of arms con-

¹⁰ This Committee was originally called by the United Nations as an 18-nation body. France, however, withdrew before the first working session.

¹¹ See Bechhoefer, *op. cit.*, p. 367.

trol. The war resulted in Germany's forced disarmament and the victors went ahead with arms control negotiations on the assumption that verification would not pose a major problem among friendly nations. After World War II, however, no assumption of good faith was possible, and the Western powers consider effective verification to be a necessary part of any major arms control plan.

TECHNICAL & POLITICAL FACTORS

There is a two-way relationship between technical and political factors which centers around the problem of verification of arms control agreements. As technical aspects grow more complicated, verification becomes more difficult. As verification becomes more difficult, the need for political willingness is greater.

It is doubtful that even the most technically thorough inspection system could detect violations of an arms control agreement if one of the parties was determined to evade it. Even Germany, an open country after World War I, was able to violate secretly the arms restrictions dictated by the Allied powers.¹²

Nevertheless, it is difficult under any circumstances to conceal *major* military activity, especially of the kind needed to mount an attack with conventional forces. Much of this is detected by espionage without the help of verification agreements.

The basic types of inspection relevant to conventional weapons include permanent observation posts in key places, roving inspection teams, reconnaissance from the air or outer space, records inspection (e.g., budget and production records).¹³ No single technique

will be adequate by itself. Cross-checking the accuracy of information with several sources would be necessary, just as it is in the case of gathering clandestine intelligence.

PREVENTING SURPRISE ATTACK

Recent proposals have concerned the prevention of surprise attack through the use of manned observation posts. In 1958 the Russians suggested that they be located at principal ports, railroad junctions and highway intersections. The United States has suggested including air bases and river crossings.¹⁴ A number of technical details yet to be determined include,

numbers of posts, exact proposed location of posts, number and nationality of personnel at posts, means of communication of the personnel at a post with their government, sharing of costs with allies, and steps to be taken in the event the posts become genuinely suspicious that a surprise attack might be in the offing.¹⁵

Roving inspection teams would have to have freedom of movement to be effective. The four-man Neutral Nations Supervisory Commission that was to watch for violations of the Korean armistice was ineffective in North Korea because it was denied freedom of movement and was not furnished adequate information.¹⁶

A study of the physical problems of arms control techniques is being conducted by the Department of Defense and the Arms Control and Disarmament Agency under the name of *Project Cloud Gap*. Part of this project is taken up with field experiments designed to find out how well human observers can locate and count military equipment without cooperation from the forces being observed.¹⁷ Other forms of verification, including aerial reconnaissance, will also be studied under *Project Cloud Gap*.

Conventional arms control in the nuclear age. Since the end of World War II the problem of nuclear arms control has received the most attention. Very little serious discussion of conventional arms control ever took place in the United Nations Commission for Conventional Armaments; further, the Soviet representative walked out in 1950, thus ending

¹² See Noel Baker, *op. cit.*, p. 161.

¹³ See Bernard T. Feld, "Inspection Techniques of Arms Control," *Daedalus*, vol. 89, Fall, 1960, p. 865 ff.

¹⁴ See Conference of the 18-Nation Committee on Disarmament Document, ENDC/110, August 16, 1963. See footnote 10.

¹⁵ Betty Goetz Lall, "Diminishing the Danger of Surprise Attack in Europe," *Bulletin of the Atomic Scientists*, March, 1964, p. 32.

¹⁶ See "U. N. Command Statement," *Department of State Bulletin*, June 11, 1956, p. 967.

¹⁷ See Lloyd Norman, "Gap in the Clouds of War," *Army*, vol. 14, March, 1964, p. 26.

the negotiations.¹⁸ Conventional armaments have generally been included in comprehensive disarmament schemes and are, therefore, tied to agreements in other areas.

The question remains whether or not conventional arms control is important by itself, in the absence of agreement on nuclear weapons. Those who believe that the most immediate danger to peace is nuclear war argue for utmost effort to control nuclear weapons. Then, even if a conventional war should break out, there would be less chance of it escalating into a nuclear war. To this view, conventional arms control would not begin to touch the main source of danger. In addition, if an agreement on nuclear arms control should be reached the political climate would probably be such as to make conventional war less of a danger.

Leo Szilard maintains that conventional weapons need not be included:

We need no longer insist that the reduction of the number of bombs and rockets to a minimal level must be accompanied by the reduction of the conventionally-armed forces. Rather, we may rely on economic considerations to limit the armies maintained by the nations of Europe, including Russia.¹⁹

On the other hand, if some form of nuclear control is achieved, the major powers might then put more reliance on conventional weapons for security and would be less willing to agree on limitation. For the past several years, the United States has been urging the Nato powers to increase their conventional contribution and, since 1961, the United States has increased the size and effectiveness of its own conventional forces. American leaders believe this will increase the number of available military moves in response to various possible threats, thereby improving military-diplomatic flexibility.

¹⁸ See Bechhoefer, *op. cit.*, p. 142.

¹⁹ Leo Szilard, "Minimal Deterrent vs. Saturation Parity," *Bulletin of the Atomic Scientists*, March, 1964, pp. 11-12.

²⁰ See Evan Luard, "Conventional Disarmament," *World Politics*, vol. 16, January, 1964, p. 194.

²¹ *Ibid.*

²² For a different point of view see Victor LeFebure, *Scientific Disarmament* (London: Mundanus Ltd., 1931).

Some will argue that because of the present stalemate in nuclear weapons, causing a fairly stable condition of mutual deterrence, the danger of resort to conventional warfare is greater, giving added importance to conventional arms control.

Evan Luard maintains that conventional disarmament by itself would be valuable, and easier to achieve than a comprehensive plan.²⁰ The major powers will continue to rely on nuclear weapons for their security because an effective control agreement is highly unlikely. The recent history of arms control negotiations, writes Luard, reveals that the most promising approach is to pursue small limited measures because of the futility of agreement on comprehensive plans. In this respect there are greater opportunities with conventional armaments, and the technical problems of control are not so great.²¹

From an examination of arms control efforts, past and present, it is clear that technical problems have not been the principal cause of failure.²² Where there is a will, there is usually a way, and the will has seldom existed. When sufficient political desire exists on both sides, technical problems will either be solved or ignored.

Nevertheless, technical problems can be complex, and, in an era in which the political setting may be growing more favorable for agreements, it is worthwhile to examine them. In situations where there is a genuine desire for agreements on the control of arms, but also a reluctance to take much of a risk, technical factors could be of crucial importance in the negotiations, for they will figure importantly in the estimation of risk to be taken by each side.

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Control of nuclear weapons, says this specialist, might well "begin with an anti-proliferation agreement, since it would seem senseless for the two powers to start cutting back on their own nuclear capabilities while at the same time helping to put other nations into the nuclear business." Once accomplishment of this seems possible, then, he continues, "the next logical step might be an effort to start the process of nuclear disarmament among the existing powers."

Nuclear Weapons Control

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IT IS SOMETIMES difficult to discuss the technical problems of arms limitation without conveying the impression that the issues of disarmament are primarily technical rather than political and strategic. The term "technical problems," as used in this article, pertains to the difficulties of creating an effective system of verification and control for whatever arms agreements might be reached.

A system of control must be endowed with sufficiently high reliability either to deter violations of the agreement (whether tacit or formal) or else to detect violations of the agreement in time to enable innocent parties to apply sanctions or otherwise to safeguard their own security.

However, the technical aspects of disarmament and arms control are closely intertwined with political, strategic and other factors. Just a few years ago, many people were of the opinion that the issues of arms limitation might be lifted above the political level if they could be handed over to conferences of experts who would confine themselves strictly

to the examination of "purely technical" questions. The experience of the 1958 Conference of Experts in Geneva, which dealt with the technical requirements of a nuclear test ban, made it clear that technical and political questions cannot be kept in separate compartments for long.

In this article, primary emphasis is placed upon these "purely technical" problems, but this will not preclude comments on the political feasibility of specific technical solutions. Interesting legal and constitutional issues arise in connection with efforts to control nuclear weapons, but they are not treated here.¹ Neither do the economic aspects of disarmament fall within the scope of this paper. Certain types of inspection and control systems might cost several billions of dollars, but it is presumed that the cost of financing such systems will constitute no intolerable burden and, under some circumstances, might conceivably ameliorate the economic difficulties of shifting from a higher to a lower level of arms spending.²

In any discussion of control, there are certain strategic matters which cannot be ignored. These relate to the nature of modern military technology, which is forever changing, and the possibility of freezing that technology through the devices of traditional diplomacy, in an era when new weapons are being developed even while agreement is slowly being reached on the semantics of

¹ Inspection will raise intricate legal questions under U. S. constitutional law, statutory law and common law pertaining to privacy rights, patent rights, and so on. See Louis Henkin, *Arms Control and Inspection in American Law* (New York: Columbia University Press, 1958).

² See *Economic Impacts of Disarmament*, U. S. Arms Control and Disarmament Agency Publication 2, January, 1962, p. 7.

controlling the older, existing weapons. Further, particularly in the early stages of the disarmament process, one must also recall the difficulties of formulating arms measures, which result in roughly symmetrical implications for the security of each side.

It is taken for granted that the process of disarmament is to be based upon a scientific approach in which the component measures, in the words of the McCloy-Zorin Agreement of 1961, "should be balanced so that at no stage of the implementation of the treaty could any State or group of States gain military advantage. . . ."³ At the start, the process of disarmament must depend to a great extent upon national declarations of arms inventories and the intelligence estimates of governments, rather than upon those kinds of data which are normal in scientific experiments.

Naturally, the element of conjecture and the possibility of misinterpretation or deception will make governments extremely wary when it comes to taking initial steps. Governments rank among the most cautious of all social institutions. If they ever consent to dismantling the implements of military power on which their security has hitherto rested (and it is sobering to remember that after 18 years of negotiations not a single weapon, not even a rifle, has yet been destroyed under an international disarmament agreement), they will do so only after the most exhaustive study of the potential consequences of every carefully circumscribed step they take.

The very fact that two powers do not possess identical weapons systems and do not

share identical strategic-military problems renders the problem of disarmament extremely complex. If one side is behind in bombers and ahead in missiles, it wishes to start disarmament by getting rid of the bombers, whereas its adversary would prefer to begin with missiles. Even on the unlikely assumption that both sides hold an equal number of long-range bombers and an equal number of long-range missiles, disarmament negotiations could still bog down over such differences as the exact range and pay load of the various delivery vehicles, the degree of protection which they enjoy as a result of hardening, dispersal or mobility, and their chances of penetrating to their target against existing defense systems.

If one side is taken to be strategically superior to the other at the start of the reduction process, there is a question whether, in specific stages, the two sides go down to a point of parity or to agreed fractions of the force levels which existed before disarmament began. If both sides are assumed to be more or less strategically equal at the beginning of disarmament, there still remains the question as to how far specific categories of arms may be safely cut back before dangerous instabilities set in. Many strategic analysts have warned that there may be a point below which it becomes very unwise to reduce nuclear forces because this might create an imbalance which degrades the existing "mutual deterrent" and raises the incentive for surprise attack.⁴ All of these are strategic problems of the gravest importance, and all of them require solutions which are, at least in part, technical. Such issues, however, cannot be treated at length in a paper which is addressed mainly to the subject of international control of nuclear weapons.

Up to now, the nations of the world have had relatively little practical experience with international inspection and control systems. The Antarctica Treaty which was signed on December 1, 1959, prohibited nuclear explosions in that region and provided that each signatory may carry out its own inspection of the area,⁵ but because of the unusual nature of Antarctica the experience gained there

³ U. S.-Soviet Agreed Statement of Principles, September 20, 1961. For text see *Documents on Disarmament 1961*, USACDA Publication 5, (Washington: G. P. O., 1962), p. 441.

⁴ See Henry A. Kissinger, "Arms Control, Inspection and Surprise Attack," *Foreign Affairs*, Vol. XXXVIII, July, 1960; Hedley Bull, "Arms Control and Surprise Attack," in *The Control of the Arms Race*, (New York: Praeger, 1961), Chapter 10; Thomas C. Schelling, "Surprise Attack and Disarmament," *Bulletin of the Atomic Scientists*, Vol. XV, December, 1959.

⁵ Article VII of the Treaty. See text in *Documents on Disarmament, 1945-1959*, Department of State Publication 7008 (Washington: G. P. O., 1960), Vol. II, pp. 1550-1556.

has been of strictly limited value. Various fissile materials control arrangements have been studied for incorporation into such organizations as the International Atomic Energy Agency (of which more will be said later), Euratom,⁶ the European Nuclear Energy Agency of the Organization for Economic Cooperation and Development, and the Western European Union. Although these organizations have furnished useful insights into what must be done to establish effective inspection, they themselves have not yet been able effectively to incorporate such measures into their own operations.

The case of the Western European Union (W.E.U.), which links the Western European Six with Britain in a mutual defense pact,⁷ is rather typical. The W.E.U. Treaty

prohibits the Federal Republic of Germany from producing atomic, biological and chemical weapons, as well as guided missiles (except for air defense), heavy warships, submarines and strategic bombers without the consent of the W.E.U. Council. An Armaments Control Agency has been established within the W.E.U. to review arms levels in all member States. But the work of the Agency has thus far been hampered by the reluctance of France to subject her nuclear weapons program to W.E.U. review.⁸ Even if the Agency should be able to operate as originally intended, it would constitute an example of cooperation only among allies, not among nations who are adversaries.

As for the three arms control agreements entered into by the United States and the Soviet Union during 1963 (the Washington-Moscow "hot line," designed to improve communications in times of crisis; the partial nuclear test ban; and the United Nations resolution of October, 1963, whereby both sides agreed to refrain from placing weapons of mass destruction into orbit), inspection is irrelevant to the first and is not called for under the other two. It is expected that the nuclear test ban and the ban on "bombs in orbit" are to be policed not through formal international inspection but through various methods of purely national verification and evaluation, i.e., through traditional intelligence-gathering activities and through the scientific analysis of data gathered from all sources. (For the text of the "hot line" agreement, see *Current History*, September, 1963; for the "nuclear test ban," see *Current History*, October, 1963; for the "bombs in orbit ban," see *Current History*, June, 1964).

During recent years, many useful theoretical studies of inspection and control problems have been performed by governmental agencies, the military services, scientific organizations, private research institutes associated with universities and industry, and individual analysts throughout the country.⁹ But in spite of all the theoretical analyses that have been undertaken, an observation made in 1961 by the former science adviser to President Kennedy is still valid today:

⁶ See Alvin J. Cottrell and James E. Dougherty, *The Politics of the Atlantic Alliance* (New York: Praeger, 1964), pp. 127-134.

⁷ The text of the Protocol Modifying and Completing the Brussels Treaty can be found in A. H. Robertson, *European Institutions* (New York: Praeger, 1958), pp. 294-297.

⁸ Although the Treaty and the accompanying protocols specify that inspections should be carried out by the Armaments Control Agency at irregular intervals and that the inspectorate should be given unimpeded access, the Convention of December, 1957, which describes in detail the functions of the Agency, has yet to be ratified by France. In the meantime, the Agency must request permission of national governments and private firms weeks in advance of carrying out inspections. See Raymond Fletcher, "Existing Arrangements for International Control of Warlike Material—Western European Union," *Disarmament and Arms Control*, Vol. I, Autumn, 1963, p. 149.

⁹ Among the many studies that have been published, the following warrant special mention: Bernard T. Feld, Donald G. Brennan, et al., *The Technical Problems of Arms Control*, for the Committee on the Technical Problems of Arms Limitation of the American Academy of Arts and Sciences, n. d.; Seymour Melman, ed., *Inspection for Disarmament* (New York: Columbia University Press, 1958); Bernard T. Feld, "Inspection Techniques for Arms Control," in Donald G. Brennan, ed., *Arms Control, Disarmament and National Security* (New York: George Braziller, 1961); Jerome B. Wiesner, "Inspection for Disarmament," in Louis Henkin, ed., *Arms Control: Issues for the Public* (Englewood Cliffs: Prentice-Hall, 1961); Report of the Woods Hole Summary Study 1962, *Verification and Response in Disarmament Agreements* (Washington, D. C.: Institute for Defense Analyses, 1962); and Lawrence S. Finkelstein, *Arms Inspection*, International Conciliation Pamphlet No. 540, November, 1962. In addition, there have been several articles in the *Bulletin of the Atomic Scientists*, *The Journal of Conflict Resolution*, *Journal of Arms Control*, and other scholarly periodicals.

[It] is extremely difficult to get agreement on a specific inspection system designed to monitor a specific reduction in the level of a specific force or weapon. This situation will persist until there is adequate understanding of the capability of the various systems and until there have been enough weapons-system studies to establish limits

¹⁰ Jerome B. Wiesner, *op. cit.*, p. 114.

¹¹ Amrom H. Katz, "Hiders and Finders," *Bulletin of the Atomic Scientists*, Vol. XVII, December, 1961, p. 423.

¹² American, British and Soviet delegates bargained at length over such issues as the following: 1) the total number of control stations needed on land and sea to police a comprehensive ban; 2) the number of stations to be located on the soil of each nuclear power; 3) the number and nationality of the staff needed to man a control station; 4) the possibility of using unmanned technical detection stations; 5) the basic structure and operating principles for a control organization; 6) the types of questions over which the veto should be retained (such as the exact location of control post sites on a State's territory; 7) financing the control organization; 8) the functions and powers of the Control Commission and the Administrator; 9) the staffing of headquarters; 10) the role of the "third third" (i. e., the neutral component in the organization); 11) the scientific problem of detecting underground explosions and distinguishing them from earthquakes; 12) the need for "on-site" inspections and the method of determining the annual number of them; 13) the staffing and dispatching of "on-site" inspection teams and air sampling flights; 14) methods whereby "on-site" inspections could be conducted (e. g., aerial overflight, ground surveys, drilling operations); 15) localization of the area to be subjected to "on-site" inspection; 16) schedule of installation of control posts; 17) nuclear explosions for detection research and for peaceful purposes; 18) a moratorium for underground tests falling below the threshold of detectable explosions; 19) methods of detecting outer space tests; 20) the adequacy of purely national means of detecting tests in all environments. See *Geneva Conference on the Discontinuance of Nuclear Weapons Tests: History and Analysis of Negotiations*, Dept. of State Publication 7258 (Washington: G. P. O., 1961); and *International Negotiations on Ending Nuclear Weapons Tests, September 1961-September 1962*, U. S. Arms Control and Disarmament Agency Publication 9 (Washington: G. P. O., 1962).

¹³ The best known plan for nuclear disengagement is the one put forth by the Polish Foreign Minister, Adam Rapacki, in October, 1957, with subsequent modifications. Originally, the Rapacki Plan called for the withdrawal of all nuclear weapons from a zone encompassing West and East Germany, Poland and Czechoslovakia. Early in 1964, the Polish Government suggested a mere "nuclear freeze" in Central Europe under "suitable" control, but details on both the freeze and the controls were lacking. For the text of this proposal, see *Current History*, August, 1964. For descriptions of the various versions of the Rapacki Plan and of counter-proposals put forth by Western individuals, see James E. Dougherty, "Zonal Arms Limitation in Europe," *Orbis*, Vol. VII, Fall, 1963, especially pp. 483-492; and Michael Howard, "Limited Armament Zones in Europe," *Bulletin of the Atomic Scientists*, Vol. XVII, February, 1962.

on the uncertainty tolerable in inspection system performance.¹⁰

A senior analyst of the RAND Corporation has insisted that, beyond mere mathematical studies, library research and paper games, there is a need for experimental *activity* in which "sizable groups engage in actual, not simulated, operations, with real equipment—shovels and cameras, as well as missiles and aircraft."¹¹ Most of the control techniques discussed in recent years have yet to be tested by governments on a substantial international scale.

The complexity of the task of setting up inspection methods and control institutions in an age of fast-moving technological change was amply demonstrated during the Geneva test ban negotiations, when a technical inspection system once accepted by the experts was later rendered obsolete by the discovery of scientific evasion techniques even before a start could be made on the construction of the projected control network. Here, too, though the Geneva talks failed to produce a control system, they yielded important insights into the technical and organizational problems of control.¹² The test ban negotiations constituted the most exhaustive dialogue on the issues of international control ever engaged in by the official representatives of governments.

There is no possibility of devising a *single* technical system for the international control of nuclear weapons. The type of system required varies with the nature of the specific objective; it depends upon what is being controlled, and the extent to which it is being controlled. The term "control" may refer to many different things: the prohibition or regulation of nuclear testing; a reduction or cessation of the production of fissionable materials; the unilateral, bilateral or multilateral imposition (e. g., by the United States or by the Nato allies) of safety devices and procedures upon existing nuclear weapons; the establishment of geographic limitations upon the deployment of nuclear weapons (i. e., "atom-free" or "denuclearized" zones);¹³ an agreement on the part of the nuclear powers to refrain from transferring nuclear weapons

to states not already possessing them; the reduction or abolition of certain types of nuclear weapons or strategic delivery vehicles (such as missiles, bombers, or submarines); the reduction of nuclear stockpiles; or the total elimination of all nuclear weapons from the arsenals of nations under a scheme of general and complete disarmament.

In each case, the projected control system is different. In fact, for each of these objectives, it is possible to select among alternative control systems. Some systems may be formally institutionalized to a high degree; others may rely upon informal or tacit communication;¹⁴ still others may combine the two approaches.

SECURITY AND SUSPICION

It would be dishonest to suggest that perfect or foolproof inspection and control systems can be devised for most types of disarmament agreements between states that are hostile to and suspicious of each other. Conversely, it is easy to show that, among states which are essentially friendly to one another, elaborate control systems are not necessary to furnish a sense of security. The need for stringent controls arises when two powers which have long been adversaries and have still not found a way to reconcile their political and ideological objectives, nevertheless become interested, for a variety of reasons, in avoiding nuclear war, enhancing the safety of the international military environment, damping the rate of arms competition, or reducing armaments levels by substantial amounts. The question then

arises as to how much reliability is needed in the control system.

Certain optimistic observers suggest that when two nations enter into an arms agreement it is because they perceive an interest in observing its provisions, and that this fact can be relied upon to compensate for deficiencies in the control system. Moreover, the optimists argue, as the atmosphere of "détente" spreads with each succeeding agreement, tensions and suspicions will subside, both sides will mutually relax, and the demand for high-reliability systems will diminish.

Most American arms control specialists, however, would probably insist that, although limited risks and margins of error might be tolerable in the earlier stages when total arms levels are high, the overall reliability of the control system should increase as physical disarmament proceeds, and that something is radically wrong if it does not. United States planning for arms control and disarmament has always been predicated upon the assumption that safeguards are necessary precisely because the other side may cheat and that its efforts to deceive might prove to be highly intelligent, strategically imaginative, and economically costly.

ANTI-PROLIFERATION PACT

Any significant Soviet-United States agreement for the controlled reduction or dismantling of nuclear weapons would logically entail several different phases. It might begin with an anti-proliferation agreement, since it would seem senseless for the two powers to start cutting back on their own nuclear capabilities while at the same time helping to put other nations into the nuclear business. This immediately raises intricate political questions of alliance diplomacy (including the proposals for a Nato multilateral fleet, as well as the rift in Sino-Soviet relations) which make a formal "no-transfer" agreement politically unlikely at the present time.¹⁵

More pertinent for purposes of this article are the difficult technical questions about the ability of "Nth countries" to acquire their own nuclear weapons. If the existing nuclear

¹⁴ Thomas C. Schelling has frequently called attention to the importance of tacit understandings. See his "Bargaining, Communications and Limited War," *Journal of Conflict Resolution*, Vol. I, March, 1957, pp. 19-36; and "Reciprocal Measures for Arms Stabilization," in Donald G. Brennan, ed., *Arms Control, Disarmament and National Security* (based on the Special Fall, 1960, Issue of *Daedalus*) (New York: George Braziller, 1961), p. 174.

¹⁵ Under the test ban treaty, the parties are obliged to withhold assistance or encouragement which might contribute to the carrying out of any nuclear explosion in one of the prohibited environments by another nation, but the Treaty provides no formal guarantee against the transfer of weapons. See *The Nuclear Test Ban Treaty*, Report of the Senate Foreign Relations Committee, 88th Congress, 1st Session, September 3, 1963, pp 3-4.

powers wish to make it as difficult as possible for other states to break into the "nuclear club," they can merely withhold completed weapons, information concerning the production of fissionable material and warhead design, delivery systems and parts, training assistance, and financial support for nuclear programs.

Nations supplying nuclear reactors to other countries for peaceful power generation can take steps to prevent diversion from peaceful to military uses either through bilateral arrangements (whereby the recipient, e. g., must return all fissionable materials to the donor for reprocessing) or by furnishing the reactor in some manner through the International Atomic Energy Agency (I.A.E.A.). This agency has developed a control system which includes an international inspectorate, strict materials accountability and review of all operating records, periodic progress reports, control of the chemical processing of all irradiated materials, the disposal of dangerous by-products and excess fissile materials, and close supervision of health and safety measures.¹⁶ For many years, however, the governments of India, Egypt, Indonesia and other young nations have objected to the I.A.E.A. control system as an infringement upon the national sovereignty of the poorer countries so long as it did not apply equally to the nuclear "haves." Not until September, 1963,

¹⁶ See Philip Noel-Baker, *The Arms Race: A Programme for World Government* (New York: Oceana, 1960), chapter 23.

¹⁷ In addition to the Bulletins of the I.A.E.A., see M. Joshi, "Dead or Alive? International Atomic Energy Agency," *Bulletin of the Atomic Scientists*, Vol. XVII, March, 1961; H. L. Nieburg, "Atoms for Peace: Hope Deferred," *ibid.*, Vol. XX, January, 1964; and Christoph Hohenemser, "The Nth Country Problem Today," in Seymour Melman, ed., *Disarmament: Its Politics and Economics* (Boston: The American Academy of Arts and Sciences, 1962).

¹⁸ *The Nth Country Problem and Arms Control*, A Statement by the N.P.A. Special Project Committee on Security Through Arms Control, and a Technical Report by W. Davidson, M. Kalkstein and C. Hohenemser (Washington: National Planning Association, 1960). This report names all the countries listed above except Israel. Israel's capabilities are discussed in Leonard Beaton and John Maddox, *The Spread of Nuclear Weapons* (New York: Praeger, 1962), pp. 168-181.

¹⁹ Arnold Kramish, *The Peaceful Atom in Foreign Policy* (New York: Harper and Row, 1963), p. 23.

did the Soviet Union agree to accept the I.A.E.A. control system for its own international nuclear aid activities.¹⁷ This, after the organization had been by-passed for seven years, not only by the U.S.S.R. but also by the United States for most of its foreign assistance activities.

Even assuming that it is not yet too late for the I.A.E.A. to prevent the "atoms for peace" program from being exploited for weapons purposes, there still remain serious doubts as to whether nuclear proliferation can be permanently avoided. A dozen states (in addition to the present nuclear powers) are known to possess the economic and technological resources to produce some Hiroshima-type bombs within this decade, if they should prove determined to do so. They are: Belgium, Canada, Communist China, Czechoslovakia, East Germany, India, Israel, Italy, Japan, Sweden, Switzerland and West Germany.¹⁸ Any country which fabricates a crude atomic bomb, based upon a design that is by now rather well known, is justified in feeling confident that the weapon will explode, even without carrying out a testing program.¹⁹ Hence the mere fact that a potential nuclear power has not announced a test need not mean that it possesses no primitive nuclear capability.

Increasingly, scientists and strategists are compelled to base their anti-proliferation hopes on the assumption that "Nth countries" will realize that a few atomic devices do not make a nuclear power, that bombs without costly delivery systems are of limited value, and that nations run high risks for dubious political and strategic advantages when they set out to build their own independent nuclear forces. On purely technical grounds, however, the prospects of inhibiting the spread of nuclear weapons technology are not very bright.

REDUCTION OF EXISTING WEAPONS

If there seemed to be a good chance of halting the spread of nuclear weapons to other nations, the next logical step might be an effort to start the process of nuclear disarmament among the existing powers. (This

might be preceded by a total nuclear test ban and by an agreement to cut off the production of nuclear materials for use in weapons.)²⁰ Formal physical disarmament, whether partial or complete, would have to be preceded by the exchange of authoritative information pertaining to the precise objects of the agreement—e. g., the size of nuclear stockpiles; the numbers and types of nuclear weapons; the location of bases of nuclear weapons delivery systems; nuclear research and development facilities; the number, location and capacity of production plants; data relating to scientific and engineering personnel, and so on. In order to inspire confidence in the reliability of the information received, each government would certainly require satisfactory verification of the veracity of the other's disclosures.

Verification might be accomplished in the first instance through aerial or satellite reconnaissance employing "high resolution" photographic methods, followed by ground inspection of randomly selected parts of each country's territory, review of governmental fiscal and military records, industrial records, transportation records, and interrogation of key personnel. Naturally, some things are easier to control and inspect than others: delivery systems are generally easier to find than nuclear weapons; strategic bomber bases are more difficult to hide than carefully camouflaged, underground missile sites; surface warships are more readily spotted than submarines.

It is precisely this requirement of verifying

²⁰ At Geneva in the spring of 1964, proposals by both President Johnson and the Soviet called for a total test ban. The former's were to be under international control and the latter under purely national policing arrangements. The President's message to the Eighteen-Nation Disarmament Committee also contained a suggestion for a cut-off in the production of fissionable materials. In April, 1964, President Johnson and Premier Khrushchev simultaneously announced a nuclear materials production cutback. (See pages 47 f. of this issue for the texts of these announcements.)

²¹ See Louis B. Sohn, "Zonal Disarmament and Inspection: Variations on a Theme," *Bulletin of the Atomic Scientists*, Vol. XVIII, September, 1962.

²² See Leonard S. Rodberg, "Graduated Access Inspection," *Journal of Arms Control*, Vol. I, April, 1963; and Lincoln P. Bloomfield, "The Politics of Administering Disarmament," *Disarmament and Arms Control*, Vol. I, Autumn, 1963.

disclosures that provokes Soviet charges of "espionage." Whereas the West often accuses the Soviets of seeking "disarmament without control," the Soviets frequently retort with the accusation that the West wants "control without disarmament." The two powers have long disagreed as to whether inspection should be confined, as the Soviets demand, to "declared facilities" (i. e., to the arms and forces which are actually being dismantled in the presence of the disarmament organization), or whether it must be extended, as the United States insists, to make sure that whatever arms and forces remain do not exceed agreed levels.

In an effort to bridge the gap between the two positions, analysts have suggested the concept of "progressive verification" under which the amount of inspection during any stage would be proportionate to the amount of disarmament being undertaken and to the degree of risk involved. One variant of this concept envisages a "zonal inspection" scheme in which each power divides its territory into a prescribed number of zones of relatively equivalent military worth and then invites the other power to select any zone it wishes for complete disarmament and complete inspection.²¹

Another variant, called "graduated access inspection," provides for initial disarmament in categories which can be inspected tolerably well with a minimum of intrusion into sensitive areas of Soviet secrecy. Thus aerial inspection is less intrusive than ground inspection; for certain types of arms reduction plans, the inspection of production facilities, transport centers and bases may be more significant than the inspection of secret communications centers and command posts, but the inspectors' rights of access to sensitive areas must increase as disarmament proceeds.²² It must be admitted, however, that at the present time the Soviets still seem extremely reluctant to permit any kind of international inspection on their territory.

Theoretically, it is possible to postulate many different forms of physical inspection to check on the disarming process and on the continuing state of disarmament which

follows. The supervision of weapons destruction by international teams is itself a form of inspection. Permanent aerial and satellite reconnaissance could detect the construction of new production plants or missile sites. Ground observers stationed at airports, railheads, ports and highway centers could be on the lookout for suspicious movements of goods or personnel. Resident inspectors could be stationed at those factories which formerly manufactured critical components of nuclear weapons and missile systems, while other plants could be subjected to spot checks to guard against conversion.²³

Strict accounting of industrial materials and skilled labor could be instituted. Scientists could be placed under a system of registration and random surveillance. Although the monitoring of governmental budgets and expenditures is of highly dubious value in the early stages, it might become more useful as an additional indicator in a disarmed world.²⁴ The experts readily concede that there are ways of evading every single technique. But they argue that the reliability of a system increases as multiple techniques are crossed with each other to be applied according to scientific sampling methods.

Most disarmament experts in this country would probably agree—albeit with caution—

²³ Cf. the articles by James H. Boyd, John B. Walsh, Eugene A. Avallone, Bruno A. Boley, Henry Burlage, Jr. and Charles J. Marsel in Seymour Melman, *op. cit.*; also Jerome B. Wiesner, *op. cit.*

²⁴ Cf. Jesse Burkhead, "The Control of Disarmament by Fiscal Inspection," in Seymour Melman, *op. cit.*; Morris Bernstein, "Inspection of Economic Records as an Arms Control Technique," in J. David Singer, ed., *Weapons Management in World Politics*, Proceedings of the International Arms Control Symposium, Ann Arbor, December 17–20, 1962 (Joint Issue of *The Journal of Conflict Resolution*, Vol. VII, No. 3 and *Journal of Arms Control*, Vol. I, No. 4).

²⁵ Seymour Melman, "How Can Inspection Be Made to Work?" *Bulletin of the Atomic Scientists*, Vol. XIV, September, 1958, pp. 271–272.

²⁶ Jerome B. Wiesner, *op. cit.*, p. 126. Cf. also Lawrence S. Finkelstein, *op. cit.*, p. 24: "It is apparent . . . that in today's circumstances, no agreement can be reached to eliminate nuclear stockpiles because no known methods would provide high assurance . . . that the total existing stockpile had been declared at the beginning of the control period."

²⁷ See *Documents on Disarmament 1962*, U. S. Arms Control and Disarmament Agency Publication 19 (Washington: G.P.O., 1963), Vol. II, p. 844.

that it is technically feasible to formulate a moderately reliable system of controls against the future clandestine production of fissionable materials and long-range delivery vehicles and the future deployment of these weapons to secret sites. But a majority of the experts would emphatically deny that a physical inspection scheme can yet be devised which can offer any assurance against the danger of nuclear weapons caches diverted from past production—i.e., hidden away out of stockpiles which had been accumulated prior to the disarmament agreement. One of the pioneers in the study of inspection writes:

One of the gravest hazards for international disarmament lies in the possibility that secret stockpiles of highly destructive weapons could remain undeclared even after agreements for stopping the production of these weapons had been signed. This danger exists whenever critical weapons have been produced in large quantities over a long period. . . .²⁵

Another scientific authority has concluded that "there is not at present any mechanical means for detecting clandestine stockpiles, and ground-search without special equipment is a practical impossibility."²⁶ As recently as 1962, a British paper submitted at Geneva contained the assertion that the total past output of plutonium from a reactor can be falsified by as much as 15 to 20 per cent.²⁷ If the bulk of the hidden nuclear material

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"The time is ripe for a bold move in outer space by the world community," says this specialist, who believes that today there is a strong possibility of effective international. . . .

Control of Outer Space

By LEONARD E. SCHWARTZ

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THE TIME IS RIPE for a bold move—the establishment of an international space agency to ensure that outer space is used solely for peaceful purposes. The United States and the Soviet Union have initiated a dialogue untypical of cold war repartee; both nations have, in addition, increased the number and level of exchanges, providing a stronger basis for structuring a new relationship with direct relevance for prospects of world peace.

Nuclear testing (other than underground testing) has been outlawed, and even this exception is a topic of active negotiation. Bombs in orbit have been declared outlawed by unanimous resolution of the United Nations. The World Meteorological Organization is about to embark on a little publicized but highly ambitious World Weather Watch. Bilaterally, the United States and the Soviet Union recently concluded an important agreement for cooperation in space communications, meteorology and mapping of the earth's magnetic field. Both nations have also concluded arrangements for the sale by the United States to the Soviet Union and Communist bloc countries of wheat, corn and tobacco. Recently, President Lyndon Johnson proposed a freezing of atomic delivery vehicles and a halt in the spread of nuclear weapons. In order to reduce the danger of war by accident, miscalculation or surprise attack, President Johnson further recommended the creation of a system of observa-

tion posts. In April, 1964, President Johnson and Premier Nikita Khrushchev simultaneously announced a reduction in the production of fissionable materials in both the United States and the Soviet Union.

As early as December 20, 1961, the United Nations General Assembly, in a unanimous resolution, declared that the United Nations Charter applied to outer space and celestial bodies, that they were free for exploration and use by all states in conformity with international law, and were not subject to national appropriation. Furthermore, all states launching objects into orbit or beyond were called upon to furnish information promptly to the Secretary-General who was to maintain a public registry.

In 1962, a significant bilateral accord was reached between the United States and the Soviet Union, commonly known as the Dryden-Blagonravov agreement, which provided for joint experiments using United States Echo II (passive communication satellite) as well as possible joint usage of active communication satellites with mutual exchange of the results of the experiments. Provision was also made for the establishment of a Washington-Moscow "cold line" for direct transmission of cloud photographs taken by weather satellites within six hours so that the data would be timely enough to be useful in storm forecasting. The third area agreed on was cooperation in compilation of a magnetic map of the earth using especially equipped satellites to

help unravel the secrets of the basic forces impinging on planet earth from outer space. On January 26, 1964, joint American and Soviet usage of the Echo II communication satellite became a reality.

Another significant accord reached during 1963 was the test ban treaty to halt nuclear tests in space, the atmosphere and underwater. Formal ratification of the treaty by the United States, the United Kingdom and the U.S.S.R. took place on October 10, 1963, and was subsequently acceded to by over 100 nations. Seven days later, the United Nations General Assembly unanimously adopted a resolution calling on all nations to refrain from using weapons of mass destruction on celestial bodies or in outer space, following the announcement by the United States and the Soviet Union that they would not station weapons of mass destruction in outer space.

Especially significant is the fact that the Soviet Union, for the first time, actually voted in favor of an international inspection system. On October 1, 1963, the Soviet bloc (except for Albania) joined 50 other members of the International Atomic Energy Agency (I.A.E.A.) in an extension of the Agency's safeguard system to cover large nuclear reactors whenever the Agency provided them to its member nations. This safeguard system is designed to prevent diversion of nuclear equipment or materials supplied through the I.A.E.A. from peaceful uses to the production of nuclear weapons. It should be noted, however, that this agreement does not require the Soviet Union to open existing nuclear facilities to inspectors.

AGREEMENTS ON THE HORIZON

In addition to the preceding events there are several other areas relating to space which are even now under active consideration or incipient development, the successful outcome of which would improve international relations still further and widen the bases for cooperation in outer space. Measures are under active consideration in the areas of international rocket launching facilities, legal space principles, and global meteorological efforts which are up to now unprecedented.

In December, 1962, the United Nations endorsed the establishment of an International Sounding Rocket Facility to be located on the geomagnetic equator. Designed to cover some of the major gaps in the world coverage of rocket sites, this facility would enable all countries, regardless of their economic or technological development or geographic location, to participate in space research. India has indicated her interest in serving as host state for this international facility. In December, 1963, a group of five space scientists approved by the United Nations Space Committee visited the projected sounding rocket launching site at Thumba, India. The United Nations Committee urged further that wherever a need is evident, other member states, in appropriate locations, consider the establishment of additional launching facilities in accordance with the basic principles approved by the committee. Although the United Nations' endorsement of the International Rocket Launching Facility in India is encouraging, there is need for a greater number of international rocket launching facilities throughout the world at strategic locations. Such action would do much to enhance prospects for wider international collaboration, generally, and for an international space agency, specifically.

Another significant advance in international space cooperation was the recent United Nations agreement on a declaration of certain legal principles to govern activities in space; namely, the rescue and return of all astronauts and space ships to the country of origin, and acceptance of national responsibility for damages caused by space vehicles to other nations.

The World Meteorological Organization is on the threshold of an ambitious program involving the World Weather Watch using weather and communications satellites as well as conventional meteorological services, and a development fund to aid developing countries in improving their weather services. When brought to fruition, this international weather program promises significant advances in weather forecasting and, eventually, increased prospects for weather control. The opportunity for many of the less developed nations to take part in this exciting enterprise would

be measurably augmented by stationing strategically placed weather stations on their territories. This, in turn, would enhance weather research and forecasting services for themselves and for the entire world community.

An important feature of the World Weather Watch deserving careful attention involves the question of whether the World Meteorological Organization can undertake a world-wide endeavor in which vital national interests are involved. Meteorological activities, like space activities, are neutral in character and potential; they can be used to advance peaceful scientific and practical goals or they can be used as fodder for the advancement of aggressive objectives.

Thus, despite limitations, a desirable momentum has been initiated. This momentum can be channeled toward the proverbial wall built stone by stone by cold war intransigence or toward the machinery of international collaboration. The danger is that inaction or lack of a positive thrust toward building a more substantial structure for relations among nations will be overwhelmed by other forces and events which create fissures in the thin fabric of budding cooperation.

Russia's "bad boy," Communist China, anxious to demonstrate her complete independence, has embraced an extreme and militant posture. France's "mononucleosis" has exhibited no signs of abatement. Cuba's "liberation" policy has led to constant crises in Latin America. Indonesia's militancy has caused strained relations with her neighbors. Their examples may be followed by others, thus compounding an already complex problem of control and restraint over nuclear and military matters.

The issue is whether current United States-Soviet exchanges will be encouraged to multiply in a framework of global cooperation or whether the portentous issues posed by the ambitions of French "grandeur" and Chinese "Stalinism," which could lead to international anarchy, will prevail. At this time, both the United States and the Soviet Union appear to be at the crossroads of a fundamental shift of policy, pondering their next move on the

stage of world power. This pause is neutral in character and of limited duration. The history of the cold war has consistently demonstrated that when such pauses are filled by summit conferences (such as the abortive Eisenhower-Khrushchev conference of 1955) the results are of little avail, if not harmful, unless preceded and accompanied by specific and thoughtful programs for cooperation. To take maximum advantage of this pause, a program for the establishment of an international space control agency should be seriously considered—and now.

There are two developments being actively considered at present—manned orbital space stations and a satellite destroyer system. Indications are that left to normal cold war pressures, these two systems would be used to augment the arsenal of United States-Soviet competition. If, however, a system for space control and inspection were to be accepted, these two projects could be used as formidable "weapons" to advance international space cooperation.

The United States has awarded over 50 study contracts during the past several years to investigate the feasibility of a manned space station. From 1959 on, the United States Air Force has reportedly spent about \$10 million a year on design studies to demonstrate the utility of man in space for military purposes. The National Aeronautics and Space Administration (NASA) has been spending approximately \$3 million a year on conceptual and design studies for a 4 to 6 man space laboratory. Although there are critical technical problems remaining before space stations can become a reality, there seems to be little doubt of their eventual establishment. In fact, 1968 is the year often cited by most authorities as likely to witness the realization of the program. At that time it is expected that Titan II or Saturn will be sufficiently advanced to provide the necessary propulsion and that the Gemini spacecraft will be sufficiently developed to ferry men, supplies and equipment to the space station.

Time is running out. The Air Force has been a persistent and vociferous advocate for establishing a role for the military in outer

space (for which, naturally, it would have the primary responsibility). Generals James Ferguson and Bernard A. Schriever, among others, have decried increasing Soviet capability in space. The greater receptivity accorded their views by Defense Secretary Robert McNamara and other top officials in the Department of Defense was recently demonstrated by the assignment to the Air Force of a study project for a Manned Orbiting Laboratory (MOL) to supply information on navigation and metallurgical questions and other "classified" projects.

The Johnson administration, however, is apparently still not committed to a specific or definite military role in space but regards MOL as "insurance" should military requirements develop. The possibility of Air Force-NASA cooperation had been indicated in a prior agreement of October 17, 1963, wherein the Department of Defense and NASA announced that they would coordinate their exploratory studies of a manned space station. Instrumental in achieving this expression of cooperation was the National Aeronautics and Space Council, chaired by then Vice-President Lyndon B. Johnson. Serious questions still remain, however, related to the huge costs involved (estimated at \$4 billion) and as to how a manned space station could best serve the national interest. NASA's prospects for primacy in manned near-earth operations, however, appear to be diminishing as those of the Air Force are gaining, while the potential role of U.S.A.C.D.A. (Arms Control and Disarmament Agency) is hardly ever mentioned.

Contributing to the complex of factors influencing the determination of an appropriate role for man in space are the contradictory statements and attitudes of the Soviet Union. One moment the Soviets call for a halt in the race to the moon; the next moment this is qualified in typically informal and off-the-cuff statements by Premier Khrushchev. Of more direct concern to United States' military strategists was the recently revealed capability of the U.S.S.R. in guidance and control of space satellites. This ability was convincingly demonstrated in the November 1, 1963, launching of the satellite, Polyot-Flight 1,

which can move up, down, or sideways and speed up or slow down. This development portends a new chapter in man's maneuverability in the near-earth zones of outer space.

Maneuverable spaceships, however, have a dual potential—they can be used as scientific or as military bases. Maneuverability can help in skirting radiation zones that might endanger the crews, or in surveying hurricanes more effectively by changing course with the moving air masses. Alternatively, and despite the doubts of various critics, maneuverable spaceships could redirect the earthly course of bombs in orbit or more effectively emplace, seek out or destroy weapons in space.

Since we cannot count on Soviet initiative, the United States has the choice of using space stations as another "weapon" in the cold war rivalry which will surely be met and checked by the Soviet Union or of braving an untested course of international collaboration by using space stations and their capability for maneuvering in space to visit, search, and seize any and all violators of the peace of the spheres. Though the more facile course might appear to be to allow the United States Air Force to fulfill its ambitions regarding military manned space patrols, this decision would confront the U.S.S.R. with the necessity of making a reciprocal move in the matching game of one-upmanship, the certainty of which has been adequately demonstrated by the history of the past 15 years.

A similar decision confronts the United States with regard to its utilization of the projected satellite destroyer system. Designed as a ground-to-space weapon to destroy bomb-carrying or other hostile satellites, the satellite destroyer system has already developed well beyond the study stage. Richard Witkin of *The New York Times* has asserted that some flight tests in the Pacific may already have been carried out.

Even after the United Nations resolution banning bombs in orbit, Dr. Harold Brown, Defense Department Director of Research and Engineering, was quoted as voicing the Administration's concern that the limited arms control measures recently negotiated

should not produce a false sense of security. Further, particular concern was expressed regarding pledges wherein the certainty of violation is inconclusive. It could rightfully be maintained that a similar skepticism might be voiced by the Soviet Union as well as by another nation. This understandable compulsion for affirmation of declarations attests to the necessity for some measure of international inspection and supervision. The overall objective at all times should be to forestall usage of outer space by any nation for military pursuits.

INTERNATIONAL SPACE AGENCY

One course of action to achieve this objective that merits consideration is the establishment of an International Space Agency (I.S.A.) to regulate and control outer space to insure its use for peaceful purposes only. This Agency would possess the authority and responsibility to insure that outer space is not used for placing bombs in orbit and would put teeth into the unanimous United Nations declarations on this topic.

Because the ingenuity of man can devise innumerable devices for camouflaging ostensibly peaceful activities, it is absolutely essential that the I.A.S. maintain as imposing a counterforce as possible for inspection purposes. This would mean the inclusion of ground satellite destroyers as well as manned space patrols for close inspection. Technicians will readily admit that no one can say with certainty that any given satellite is a bomb carrier. Accordingly, there is no short cut to a complete and close inspection system operating from the initial launching point, where the payload of the satellite would be verified to be in accord with its declared mission(s), and where the satellite would be identified and given an international registration number and, subsequently, kept under constant international surveillance by tracking stations maintained by the International Space Agency. Periodic inspections of the satellite(s) in orbit should be conducted by the I.S.A. using telemetry equipment as well as first-hand observations in space. Finally, I.S.A. should be empowered to inspect, neu-

tralize, disarm and destroy any satellite it considers hostile.

In order to implement this inspection program, the I.S.A. would have to be authorized to require all nations to register all satellite launchings for which I.S.A. would devise an appropriate international numbering and identification system as a master control for all launchings. Further, I.S.A. should inspect each satellite prior to launching to insure that the instrumentation, equipment and all other configurations of the satellite are compatible with its publicly declared purposes. To assist it as a "watcher of the skies," I.S.A. should have access to a globally dispersed tracking system to confirm periodically the total number and position of the satellites. These measures would considerably enhance the capacity of I.S.A. to exert effective control over outer space by rendering suspect and, therefore, subject to confirmation any unannounced changes in satellite population as well as any unannounced changes in orbit.

The Agency should have the authority to determine that all space satellites, whether reconnaissance, surveillance, navigation, meteorological or communication, are being used for peaceful pursuits only. In order to provide the capability to execute this authority, the I.S.A. should have direct access to a number of functional unmanned satellites. To enhance further its inspection capabilities, the I.S.A. should also be entrusted with its own international manned space patrols, satellite interceptors and early warning satellites. All of these satellites should be strategically positioned in space by the I.S.A. and in such numbers and combinations as to maximize its control of outer space. Only upon the existence of a comprehensive international inspection system could a nation feel that no other nation would be permitted to gain undue influence in the environs of outer space.

Additional inspection systems that could measurably enhance I.S.A.'s control capabilities include devices used for detection of nuclear tests. Most prominent are the three Vela satellite series undertaken by the United States. Significant progress was made recently in the Vela-Hotel program in monitor-

ing atomic explosions in the atmosphere. On October 17, 1963, two nuclear detection satellites were launched and subsequently shifted into a prescribed circular orbit of 57,000 miles equipped with instruments to pick up evidence of nuclear blasts more than 100,000 miles away. The launching, "officially secret," was the first of five in the ten-satellite program of Vela-Hotel. The other two detection programs in the series are Vela-Sierra, to monitor tests on the earth's surface or in the atmosphere, and Vela-Uniform, to develop measures for detecting atomic tests underground. Another device recently developed to detect atomic blasts in the atmosphere is the Loran-C radio navigation network, already distributed throughout the world. With slight modifications, this network of radio navigation stations can now detect nuclear explosions of over a million tons of TNT at altitudes above 50 miles.

A useful feature of the inspection system described above is that each of the steps can be viewed as desirable and feasible in itself or as a building block to the succeeding stages. As a first step, before the I.S.A. begins its regulatory activities, it might be desirable to clear outer space of all unwanted satellites and rocket components usually designated as "space junk." (Over 400 pieces of rockets and rocket components are believed to be orbiting in space as unwanted debris.) Thus, the first year of the I.S.A.'s activities could be designated for historians as "Space Age Control Year I."

The next step, which would appear to be the most feasible from the political and technical standpoint, could be the pre-launch inspection stage. Here registration, licensing, regulation, numbering, and certification of satellites could take place. In the following stage, an international ground-based capability could be instituted using tracking systems, electronic ground controls, and ground-to-satellite destroyer systems. The third stage, which is politically and technically more challenging, would comprise satellites positioned in outer space and would include unmanned satellites (observational, reconnaissance, surveillance, command and control, and nuclear

detection devices) and man-in-space security patrols.

There are additional possible uses for such an inspection system, whether it is executed in stages or in one large step. One notable function assignable to an inspection system in space is to aid in monitoring any disarmament agreements reached on earth. Internationally accepted identification and numbering systems could be used to advance scientific as well as inspection objectives. For example, scientists tracking satellites for geodetic and other purposes cannot effectively compare results unless there is a common registration and certification system. These additional uses, however, could either be viewed as bonuses to an inspection and control system for space or they could be examined separately from a space control system to determine their political acceptance and technical feasibility.

At this point, some skeptics might retort, "Well, the objectives and methods may be fine, but what are the prospects for creating such an agency?" In partial reply, one could cite the equally difficult challenge confronting attempts to establish a multinational force in Nato. The commendable persistence and perspicacity exhibited by the Kennedy administration, and reinforced by President Johnson thus far, in pursuing the Nato objective despite French and other intransigence, could be applied with equal vigor to a multinational space agency to maintain peace in the universe as Nato strives to do in the North Atlantic area. Moreover, since inspection is an integral and fundamental function of I.S.A., the United States cannot go it alone; multinational collaboration is a *sine qua non*.

REALIZATION OF A SPACE AGENCY

There are a series of alternatives available to the United States in achieving realization of an international space agency. One alternative is that the United States declare simply that it will not use manned space stations for military purposes and that it will abandon its project for an anti-satellite system. Some policy analysts contend that we would be abandoning our "solid" military posture for an

ephemeral hope. The author agrees that unilateral declarations, being subject to instantaneous recall, do little to instill credibility among our allies, let alone our antagonists; and at best can only encourage an equivalent counterdeclaration, representing an appearance of equality without substance or means of confirmation. It would seem, therefore, that some type of multinational association based on inspection and confirmation would be the only way to assuage the fears and suspicions present on all sides.

A GRADUALIST APPROACH

Another alternative available to the United States for realizing the establishment of an international space agency is based on a gradualist approach, step-by-step, versus an instantaneous and comprehensive approach. Rather than assume that the Soviet Union would refuse to join the I.S.A., the United States could make a thoughtful and concerted attempt to invite the U.S.S.R. to collaborate jointly in the initial formulation of the I.S.A. This direct appeal to all nations draws its greatest strength from the fact that outer space is common to the entire community of mankind. It is readily acknowledged that the comprehension of spatial phenomena can be advanced measurably by encouraging a larger number of nations to join in the exploration of space. On the other hand, no one nation has the authority or even the ability to dictate how outer space should be used and to make of it an arena for the advancement of purely national ambitions.

By adroit diplomatic soundings, the views of the Soviet Union and other members of the world community could be obtained and synthesized either through the foreign ministries of each country or under United Nations auspices into the form of an aide-memoire suggesting the alternative shapes that an I.S.A. could take. Used as a working paper, this memoire could then be discussed and dissected in detail at a special conference of the international community, if possible under United Nations sponsorship, to arrive at an understanding of objectives, organization, membership, budget, voting rights, and pro-

cedures for adjudication of disputes. Instructive insight could be gained from the manner in which the International Atomic Energy Agency was brought into being, though greater care should be exercised to profit from the latter's shortcomings both at its inception and during its lifetime.

Should diplomatic soundings reveal that the inclusion of every nation in the I.S.A. from the very outset is overly ambitious, recourse might be had then to a gradualist approach which would have several subsidiary phases. The gradualist plan is premised on the assumption that some inspection among some nations is not only preferable to none at all but is a worthy enterprise in itself and, furthermore, increases prospects for adoption on a broader scale. Gradualism proposes a reciprocity of moves based on a positive appeal to insure the use of outer space for peaceful purposes as contrasted with the destructive and negative appeal promoted by those whose only solution to the problem lies in the escalation of all sorts of weaponry in outer space.

All nations participating at any given time in the I.S.A. would be represented on its Governing Board, which would determine the operational deployment of the entire space inspection system and the logistics, manning, equipment, launch facilities, bases and financial support required. Though there are various formulae for determining the distribution of this support, the most important consideration is that each and every nation participating share a definite role and definite responsibility.

A BEGINNING

As a modest beginning, the United States and Canada could draw up an agreement for joint execution of the regulatory and control functions previously described for the proposed I.S.A. Canada's position in international relations is highly respected, most notably her concern for world peace, personified by her Prime Minister, Lester Pearson. This bilateral arrangement could be undertaken as an experiment to test the effectiveness of the proposed agency and to iron out any organiza-

tional and technical wrinkles. United States-Canadian collaboration could lead to wider partnership by inviting the Latin American nations to join and to contribute their nationals, equipment and facilities to the enlarged I.S.A.

After a given period, a pause for reexamination of the functions, staffing, logistics, procedures, and detailed operation of the I.S.A. should take place, resulting in such changes as may be deemed necessary. Subsequently, Britain and the Common Market countries and, later, all of the Nato nations could be invited to join the ranks of the I.S.A. and submit their satellite launchings to its control as well as funds, equipment and personnel. Should France prove to be unwilling to associate herself, she might be left outside for a time and progress made with those willing to participate. (It is of some interest to note that France was recently reported to have plans for launching a four-pound satellite in 1964. This "pocket" satellite (SATMOS) would be launched by the French Army's National Office of Space Research in a program independent of the civilian space agency.)

GROWING UNIVERSALITY

Following another period of operation, testing and examination, the multitude of nations comprising the politically neutral world could be invited to participate, which would significantly enhance the universality of I.S.A. and provide thereby an even more credible instrument for ensuring universal security. Each new entrant should be fully convinced of the necessity of contributing money, equipment, facilities and personnel to maintain the inspection posts on earth and in space, as well as international launching bases, according to its individual capacity but with constant stress on the importance of all participants performing an active and responsible role in I.S.A. After these moves, which could be undertaken in the separate phases indicated or in those combinations possible within the dynamics of politics and operational requirements, the members of the Soviet bloc could then be asked to join; concurrently, or subsequent to this, Communist China could be invited.

THE TIME IS RIFE

The time is ripe for a bold move in outer space by the world community spurred on by the United States because the technology for the next phase of weapons as exemplified by manned space stations and satellite destroyers is not yet fully developed. The crucial decisions concerning the future of these weapons in the United States, and possibly in the U.S.S.R., have yet to be made, permitting a redirection of their functions on behalf of the proposed I.S.A. and eventual space control for peace.

The time is ripe for a bold move because independent-minded countries like Communist China and France have yet to achieve full realization of their military potential and ambitions.

The time is ripe for a bold move because the fears and suspicions within the United States and the U.S.S.R. laid open by the recent probings for peace illustrate that exclusive reliance on military exploits is based on uncertainty and leads only to despair and, perhaps, conflagration.

The time is ripe because the United States and the Soviet Union have made comparatively significant progress in declaratory peace. Complementary programs and projects are necessary to maintain and to mobilize this momentum. The assurance of peace in outer space offers itself as an appropriate candidate.

Leonard E. Schwartz has had considerable experience in the field of outer space research. In the middle of 1962, he was named as a specialist in this field to the Stanford Research Institute. From 1960 to 1963, he was with the National Academy of Science's Space Science Board, during which time he also served at Duke University's World Rule of Law Center. Still earlier he pursued research into peaceful space activities at the Brookings Institution. Author of *International Organizations and Space Cooperation* (Durham, N.C.: Duke University Press, 1962), among other works, Mr. Schwartz is currently at work on a monograph on World Meteorological Organization and the World Weather Watch.

CURRENT DOCUMENTS

Reducing Nuclear Materials Production

On April 20, 1964, President Lyndon B. Johnson announced at the annual luncheon of The Associated Press that he was ordering "a further substantial reduction in our production of enriched plutonium"; Soviet Premier Nikita Khrushchev issued a statement that same day revealing that the U.S.S.R. was also reducing its production of fissionable materials. The portion of President Johnson's announcement dealing with plutonium production and the full text of Premier Khrushchev's announcement follow:

PRESIDENT JOHNSON'S ADDRESS

... I am taking two actions today which reflect both our desire to reduce tension and our unwillingness to risk weakness.

I have ordered a further substantial reduction in our production of enriched uranium to be carried out over a four-year period. When added to previous reductions, this will mean an over-all decrease in the production of plutonium by 20 per cent, and of enriched uranium by 40 per cent.

And by bringing production in line with need, and the chart shows now that our production is here, and our need is here, and our reduction today will bring it here, we think we will reduce tension while we maintain all the necessary power. We must not operate a W.P.A. nuclear project just to provide employment when our needs have been met. And in reaching these decisions, I have been in close consultation with Prime Minister Douglas-Home.

And simultaneously with my announcement now, Chairman Khrushchev is releasing a statement in Moscow at 2 o'clock our time in which he makes definite commitments to steps toward a more peaceful world. He agrees to discontinue the construction of two big new atomic reactors for the production of plutonium over the next several years [sic], to reduce substantially the production of U-235 for nuclear weapons, and to allocate more fissionable material for peaceful uses.

This is not disarmament. This is not a declaration of peace. But it is a hopeful sign and it is a step forward which we welcome and which we can take in the hope that the world may yet one day live without the fear of war.

At the same time I have reaffirmed all the safeguards against weakening our nuclear strength which we adopted at the time of the test ban treaty...

PREMIER KHRUSHCHEV'S STATEMENT

A certain relaxation of international tension has been achieved of late as a result of active, persistent efforts by all peace-loving states and peoples. It can be said with full confidence that a big contribution to this has been made by the conclusion of the treaty banning nuclear weapon tests in the atmosphere, in outer space and under water—the first agreement in history designed to put a brake on a further intensification of the nuclear arms race.

It was with great satisfaction that the peoples also met the understanding between the U.S.S.R. and the United States, sealed in a resolution of the United Nations General Assembly, to refrain from orbiting vehicles carrying nuclear weapons. The Soviet Union, the United States and a number of other states took steps toward some reduction in their military budgets for 1964.

All this facilitated a definite strengthening of confidence in the relations between states and the creation of a more favorable situation for the adoption of further measures that would lead to the discontinuance of the arms

race, to the solution of the main problem, the problem of disarmament.

Advocating an early solution of the problem of disarmament, the taking of effective steps toward the discontinuance of the arms race, especially the nuclear race, the Soviet Government seeks to take advantage of any opportunity to achieve in international affairs mutual understanding with other states with regard to the necessity of avoiding a nuclear war.

On behalf of the Soviet Government I should like to declare that the opportunity for improving such mutual understanding has now arisen in connection with the question of the manufacture of fissionable materials for nuclear weapons.

It is common knowledge that plutonium and uranium-235 are the starting materials for the manufacture of nuclear weapons. It is inside their atoms that chain reactions originate that engender devastating nuclear explosions.

For many years already the nuclear powers have been steadily stockpiling plutonium and uranium-235, vying with each other [sic] who has more of these materials for nuclear weapons, and in doing so assuming very considerable expenditures, since plutonium and uranium-235 are produced on the basis of intricate technological processes, demanding expensive equipment and large expenditures of power.

The nuclear arms race, the competition of nuclear powers in stockpiling fissionable materials, have not been initiated by the Soviet Union. We were not the first to include this monstrous weapon of mass annihilation into military arsenals. But we must show concern for safeguarding the security of our country and all Socialist states and do this on a scale that is in line with the situation.

A moment has now come when the possibility emerged of taking steps toward a reduction of the manufacture of fissionable materials for military purposes. The Soviet Government has examined the question to what limit our country can go in this direction, given the present balance of nuclear power in the world arena, without in any way weak-

ening the defenses of the Soviet Union and the firmness of the nuclear rocket shield, reliably safeguarding the security of all countries of the Socialist community.

Carefully weighing all data that have a bearing on the nuclear potential of the Soviet Union, on the one hand, and of the nuclear powers, parties to NATO [North Atlantic Treaty Organization] on the other, analyzing all circumstances, the Soviet Government took the following decision:

1. To discontinue now the construction of two new big atomic reactors for the production of plutonium.

2. In the next several years to reduce substantially the production of uranium-235 for nuclear weapons.

3. Accordingly, to allocate more fissionable materials for peaceful uses—in atomic power stations; in industry, agriculture, in medicine, in the implementation of major scientific, technical projects, including the distillation of sea water.

President Lyndon Johnson of the United States and Prime Minister Sir Alec Douglas-Home of the United Kingdom have notified me that they would issue statements on the practical measures in the field of reducing the manufacture of fissionable materials for military purposes, which will be undertaken by the United States and the United Kingdom respectively.

We are convinced that this latest step, though it does not yet constitute factual disarmament, will be assessed by the peoples as continuation of the course set at the conclusion of the treaty banning nuclear weapon tests and will promote a further improvement in the international atmosphere.

But one must go further. It is the profound belief of the Soviet Government that the efforts must be redoubled in searching for a solution of the main problems of disarmament, in adopting more and more effective measures of strengthening universal peace. This is demanded by the vital interests of all states, all peoples.

The Soviet Government is ready to take such further steps in agreement with other powers.

BOOK REVIEWS

THE UNITED NATIONS EMERGENCY FORCE. By GABRIELLA ROSNER. (New York: Columbia University Press, 1963. 294 pages, index and bibliography, \$6.75.)

Miss Rosner's thorough and careful analysis of the United Nations undertaking in the Middle East is the first comprehensive study of this modern "weapon of peace." *The United Nations Emergency Force* gives the reader a clear picture of the development of the ideas and plans for the force and an appreciation of the many difficulties consequent to its establishment. The careful analysis of its constitutional basis, financial situation and legal status are presented as important considerations for evaluating the feasibility of the establishment of a permanent United Nations force.

Alexine Atherton
University of Pennsylvania

BUILDING THE ATLANTIC WORLD.

By ROBERT STRAUZ-HUPÉ, JAMES E. DOUGHERTY, AND WILLIAM R. KINTNER. (New York: Harper & Row, 1963. 400 pages, and index. \$6.00.)

The thesis of this important book is that the major challenge confronting the West is not Soviet expansionism or Chinese militancy—though these are serious and continuing problems—but rather the danger that intra-Western discords will forestall the establishment of a lasting and stable unity within the Atlantic world.

Clearly, and with insight, the authors trace the postwar efforts at promoting Western unity: the establishment of Nato; the evolution of a Western military response to the Soviet threat; the economic institutions that have been created to promote closer economic ties; and the problems arising out of a need to arrive at a common nuclear policy for the alliance.

The authors make a strong and persua-

sive case for an increased degree of *political* integration of the Western world: "Nothing less than the creation of a confederacy will halt the drift of NATO toward impotence and dissolution. The attempt to keep NATO a military alliance and *no more than a military alliance* is tantamount to seeking its destruction . . . Fear alone will no longer keep together NATO." Certainly, the dissonances occasioned recently by President de Gaulle's policies dramatize the need for steps that will bridge the growing gaps within the Western alliance.

THE COLD WAR: IDEOLOGICAL CONFLICT OR POWER STRUGGLE?

EDITED BY NORMAN D. GRAEBNER. (Boston: D. C. Heath & Company, 1963. 105 pages, \$1.50.)

In his introduction to this useful compendium of interpretations of the bases of cold war, Professor Graebner observes that studies of the cold war fall consistently into two competing groups. One important body of scholarship considers Soviet foreign policy as essentially that of a great power seeking security and influence; the other group of specialists believes that the U.S.S.R. poses a mortal challenge to the West and to Western institutions, that the cold war is "a limitless contest between freedom and tyranny, a totally revolutionary struggle propelling history down to its final, dangerous course."

To provide illustrative analyses of these divergent viewpoints, he has compiled a series of eleven articles by such experts as James Reston, George Kennan, Zbigniew Brzezinski, Robert Daniels and Philip Mosely. The articles are focused, analytical, and stimulating, a valuable supplement to other materials dealing with Soviet foreign policy.

A.Z.R.

COLD WAR AND WEAPONS CONTROL

(Continued from page 5)

the one hand, of the liberation of former colonial peoples from colonial dependency and the creation of new independent States and, on the other, of major social and economic changes caused by the natural historical process of the revolutionary transformation of society in accordance with the interests and wishes of the popular masses struggling for national and social emancipation. . . . it would be quite unrealistic to believe that this many-sided historical process can be contained within any predetermined framework. To do so would be to attempt to impose on each country or nation, from outside and by means of interference in its domestic affairs, a framework, laws and principles which may be unsuitable to that country or nation, which is the master of its own fate. The political purpose of such external regulation of the whole varied process and countries can only be to delay the progressive development of society and to impede the national liberation movement and the far-reaching social and economic changes which are in progress and which must inevitably come about in the different countries of the world.⁴

THE VICIOUS CIRCLE

Here we are obviously back to our old problem of political settlements. G.C.D. poses this problem in its most extreme form, for it calls for agreement upon arrangements to settle any aspect of world affairs that might lead to armed action or rearmament. So long as a cold war continues, so long indeed as any fundamental lack of trust exists between nations, it is clearly going to be virtually impossible to agree upon the constitution for what would be in effect a world government. G.C.D. is therefore no escape from the problems of achieving arms control in a world of conflict.

We are forced to the conclusion that, while Russia, the United States and other nations, probably including even the Chinese, will continue to try to avoid the outbreak of a major nuclear war, and will take account of this purpose in the design of their forces and the choice of policies they pursue, explicit arms control agreements of a far-reaching nature

will be rare as long as major political conflicts persist. This is so because major arms control measures imply settlements for many outstanding political issues and inevitably prejudice the outcome of other situations as yet unforeseen. Fear of war is a powerful stimulus to caution, but it is a narrow and negative basis on which to build a common, positive approach to international order.

Thus, if measures like the test ban are first steps, they are more likely to be steps toward similarly limited measures than toward a general reconciliation. That is not to say that a degree of reconciliation may not be attained as a result of broad political trends. But arms control measures themselves must be judged on their own particular merits. It would be a serious mistake to accept imperfect arms control arrangements merely for the hope of improving the atmosphere. Indeed, such improvement as has occurred seems to have been produced precisely by the sternness of the military confrontation. It therefore seems wise to suggest that policies that reduce the pressure on the Soviet Union could produce exactly the opposite effect to that intended.

The conclusion would seem to be that while one should gladly undertake arms control measures carefully calculated to stabilize and extend the existing stalemate, one should take every precaution against abandoning vital elements in that stalemate merely in a vaguely benevolent effort to express the spirit of moderation that the stalemate has itself produced.

WEAPONS AND TECHNOLOGY

(Continued from page 11)

under consideration.¹² For the Navy, submersible cargo and troop carriers, high-speed sea lift, anti-submarine warfare devices and ocean bottom mounted systems are being considered. For the Army, armored vehicles capable of making right angle turns at high speed, night-seeing tanks and powerful new anti-tank weapons may be developed.

¹² For excellent treatment of space weapons from an arms control point of view, see Donald G. Brennan, "Arms and Arms Control in Outer Space" in *Outer Space, Prospects for Man and Society*, edited by L. Bloomfield (New York: Prentice-Hall, 1962).

⁴ E.N.D.C., April 10, 1962, *Ibid.*, p. 6.

The weapons of this decade have been, as those of the next will be, a product of the weapons planning cycle. Each new weapons system takes many years to develop and perhaps even more to become an operational part of the arsenal. It does little good to think of the present threat when starting to plan new systems. In starting to plan a new system, the mission to be performed must be understood in terms of the future world in which it is to operate.¹³

The planner must first build a world of fantasy, a world of the future. Then he must define the "defenses" necessary in order to survive that world. Having this vision in mind, the performance requirements for a future system must be established followed by a preliminary design of the system. And so the cycle continues. Thusly, the weapons system planner begins to build the weapons of his fantasy world, and to transform his fantasy into reality.

The new world need not be the one suggested by this article. It could be more stable. But that more stable world must first be created in the minds of men.¹⁴ Only then can that fantasy be transformed into the living world of tomorrow.

¹³ For an excellent annotated bibliography relating to these forces, see Stillman P. Williams, *Toward A Genuine World Security System. An annotated bibliography for layman and scholar* (Washington, D. C.: United World Federalists, 1964) [Pamphlet: \$1.00, send to 1346 Connecticut Avenue, N.W., Washington, D. C.]

¹⁴ For the effects of developments in military technology and their influence on U. S. strategy and foreign policy, see Jay H. Cerf and Walter Pozen, *Strategy for the '60s* (New York: Frederick A. Praeger, 1960).

WEAPONS AND MEN, 1964

(Continued from page 17)

morale of China's army has been reported as low because of its use as a labor force and because of conflicts between the younger modern-minded officers with the older leaders steeped in the guerrilla tradition. But as the invasion of India demonstrated once again, this army is an effective fighting force. If it would be foolish for the West, or the Soviet Union, to discount China's military effectiveness now, we may be sure that it will be even

more foolish in the future. Indeed, one can only wonder at the long-range effectiveness of any disarmament negotiations to which the Chinese Communists are not a party.

BIOLOGICAL AND CHEMICAL WEAPONS

(Continued from page 24)

possible, for inspection teams to discover even if they have almost unlimited access to a country.

A B.C.W. capability concealed under similar circumstances might give a nation a position of predominance in a world in which other nations had disarmed. In fact, biological and chemical weapons may be concealed with greater ease than can nuclear armaments. They are smaller in size and contain even greater destructive capabilities than do atomic weapons. The task for inspectors is even greater with respect to biological weapons than with most other kinds of armaments.

A disarmed world is not possible without the abolition of biological and chemical weapons. Yet the technical problems of controlling nuclear armaments appear relatively simple by comparison with those confronting the limitation of B.C.W. Until such problems are resolved, nations are likely to continue their efforts to develop stockpiles of B.C.W. More countries today have capabilities in biological and chemical weapons than in atomic arms. Because they are not so expensive as nuclear arms, many powers may acquire B.C.W. in the years to come. Nevertheless, nations remain reluctant to use biological and chemical weapons. The fact that B.C.W. has not been employed in the last generation results from tacit understandings between potential users in the absence of arms control agreements. Hitler did not employ chemical and biological weapons because he feared retaliation in kind. Undoubtedly, the Soviets harbor similar apprehensions. If recent history provides a guide to the future, the principal safeguard in the absence of an arms control agreement against the use of B.C.W. lies in mutual deterrence, rendering the employment of such weapons unprofitable to a po-

tential aggressor. Nevertheless, it is the formidable task of arms control planners to seek solutions to the complex problems of controlling biological and chemical weapons.

NUCLEAR WEAPONS CONTROL

(Continued from page 38)

should be in the form of thermonuclear weapons, it is not difficult to imagine one or two thousand megatons of destructive power sequestered for years in a few remote caches, waiting to be delivered by commercial jet aircraft converted to military use. Such potential margins of error or deception pose enormous risks to the superpowers and make both of them extremely cautious in disarmament negotiations. In fact, this one technical problem makes it virtually impossible for either side to think seriously of *complete* disarmament as a feasible goal for the foreseeable future.

Perhaps it is the problem of clandestine stockpiles more than anything else which has prompted some analysts to suggest novel and radical methods of control. Instead of concentrating on the search for *physical* evidence that a violation has occurred, these scientists would prefer to seek *non-physical* evidence, mainly in the form of human knowledge—either a) volunteered knowledge (or “inspection by the people”) which implies that in-

dividual citizens are motivated by a system of rewards and punishments to inform against their own government officials or fellow citizens who engage in prohibited activities; or b) detected knowledge, which involves the use of modern psychological testing techniques upon personnel most likely to know whether a violation has occurred.²⁸ It seems highly unlikely, however, that nations are at all ready to enter such sweeping disarmament agreements as entail drastic revisions of human political attitudes (e. g., citizen loyalty) or require key officials to undergo polygraph tests, depth interviews or the use of “truth serum” injections.

In the final analysis, the degree of reliability needed in a control system is a matter for political rather than technical determination. For certain types of arms agreements, both parties may find it to their interest to furnish “positive evidence” that they are complying with the agreement in order to allay suspicions that violations are occurring.²⁹ Under other conceivable circumstances, arms agreements might be characterized by tensions, suspicions and deliberate deception. Governments would have no choice but to remain on their guard under any kind of disarmament, for they know that nations will always possess the technical capacity to “re-establish what has been dis-established, to remember or to re-invent what has been laid aside.”³⁰

Eugene Rabinowitch has warned that war might break out more easily between disarmed powers than between armed nations, and that such a war, once initiated, would inevitably become nuclear.³¹ Realizing that disarmament would not abolish either power politics or the threat of rearmament races, governments must be keenly concerned about the technical problems not only of detecting violations, but also of responding to them effectively if and when they do occur, for credible preparedness alone could deter them.³² In sum, it can be said that the very scientific developments which make disarmament more desirable than ever also challenge as never before the ingenuity of those who would demonstrate its technical feasibility.

²⁸ Cf. Lewis C. Bohn, “Non-Physical Inspection Techniques,” in Donald G. Brennan, *op. cit.*; Jay Orear, “New Approaches to Inspection,” *Bulletin of the Atomic Scientists*, Vol. XVII, March, 1961; Elton B. McNeil, “Psychological Inspection,” *Journal of Arms Control*, Vol. I, April, 1963; and Thomas C. O’Sullivan, “Social Inspection,” in J. David Singer, ed., *op. cit.*

²⁹ See Robert Bowie, “Basic Requirements of Arms Control,” in Brennan, *op. cit.*

³⁰ Hedley Bull, *The Control of the Arms Race* (New York: Praeger, 1961), p. 34.

³¹ “Defenders and Avengers,” *Bulletin of the Atomic Scientists*, Vol. XVI, November, 1960.

³² Fred Charles Iklé, “After Detection, What?” *Foreign Affairs*, Vol. XXXIX, January, 1961; Louis B. Sohn, “A General Survey of Responses to Violations,” *Journal of Arms Control*, Vol. I, April, 1963; and Richard J. Barnett, “Violations of Disarmament Agreements,” *Disarmament and Arms Control*, Vol. I, Summer, 1963.

THE MONTH IN REVIEW

A CURRENT HISTORY Chronology covering the most important events of May, 1964, to provide a day-by-day summary of world affairs.

INTERNATIONAL

Berlin

May 15—At a luncheon of the Foreign Policy Association in New York City, West Berlin Mayor Willy Brandt states that Western cooperation with East Europe will “make the will for peace grow.”

Euratom

May 27—The U.S. and the 6-nation European Atomic Energy Community sign 2 agreements providing for closer cooperation in developing peaceful uses of atomic energy.

European Economic Community (Common Market)

(See *Intl, Tariffs and Trade Negotiations*)

North Atlantic Treaty Organization (Nato)

May 12—The Ministerial Council of Nato opens its meeting at The Hague, Netherlands. U.S. Secretary of State Dean Rusk declares that the West has not reached a genuine détente with the U.S.S.R., and warns of continuing Communist trouble in Cuba and Vietnam.

May 13—It is reported that, at a closed session, Belgian Foreign Minister Paul-Henri Spaak challenged French Foreign Minister Maurice Couve de Murville to defend French criticism of Nato.

Italian Manlio Brosio is elected the new Secretary-General of Nato; he will succeed retiring Dirk U. Stikker on August 1, 1964.

May 14—In a communiqué issued at the end of a 3-day meeting, the 15 member nations urge that an agreement be worked out with the Soviet Union on reunifying Germany on the basis of self-determination.

Tariffs and Trade Negotiations

May 6—At the tariff negotiations in Geneva (the “Kennedy round”), the 43 participating nations adopt a statement declaring that they will use a 50 per cent “across the board” tariff reduction as a guideline during negotiations. The statement expressing a tentative 50 per cent cut was worked out by Britain, the U.S. and the European Common Market.

United Nations

May 5—At the reopening of the U.N. debate on Kashmir, recessed for 6 weeks, Pakistani Foreign Minister Zulfikar Ali Bhutto urges the Security Council to invite Sheik Mohammed Abdullah of Kashmir to participate.

May 18—The Security Council issues a final statement ending debate on Kashmir; the statement urges India and Pakistan to renew negotiations on Kashmir.

May 21—U.S. Representative to the U.N. Adlai Stevenson addresses the Security Council on the question of Laos, Cambodia and the entire question of Communist aggression in Southeast Asia. Officially the Council is meeting to debate Cambodian charges that the U.S. has attacked her from South Vietnam. Stevenson finds unacceptable proposals that the 14-nation Geneva conference on Indochina meet to consider the situation there. Stevenson reaffirms U.S. determination to preserve the independence of the Southeast Asian governments. He suggests that the U.N. patrol border areas. (See also *Cambodia* and *Laos*.)

May 28—Foreign Minister Huot Sambath of Cambodia tells the U.N. Security Council

that Cambodia is willing to permit a U.N. team to help demarcate the Cambodian-South Vietnamese border.

ALGERIA

May 6—*Tass* (Soviet press agency) discloses that yesterday Soviet Premier Nikita Khrushchev and visiting President Ahmed Ben Bella signed a joint communiqué: the Soviet Union has agreed to give Algeria 115 million rubles (\$127.6 million) in long-term credits; Ben Bella voices support for the U.S.S.R. (See also *U.S.S.R.*)

ARGENTINA

May 1—In his State of the Nation address at the formal opening of Congress, President Arturo Illia outlines a 5-year recovery program.

May 27—By order of the General Labor Confederation, workers occupy factories or stage sit-down strikes at some 1,000 plants in leading cities to demand wage increases.

BOLIVIA

May 23—The Communist party of Bolivia announces that it will withdraw from the presidential elections scheduled for May 31. This leaves only President Victor Paz Estenssoro's party, the National Revolutionary Movement, in the election.

May 27—Paz announces that he will not postpone the election.

May 31—Victor Paz Estenssoro is reelected for his third four-year term in an uncontested election held today.

BRAZIL

May 7—President Humberto Castelo Branco sends Congress a bill to reorganize banking powers under a strong central agency; the bill is considered essential to an anti-inflationary program.

May 11—The Governor of the state of Acre is deposed by the Legislative Assembly under military pressure. He is the fourth Brazilian governor to be ousted since the April 1 revolution.

May 12—The Brazilian government terminates diplomatic and consular ties with Cuba.

BRITISH COMMONWEALTH OF NATIONS, THE

Canada

May 19—Canadian Prime Minister Lester Pearson tells the House of Commons that he will stake the life of his government on the issue of a new "distinctly Canadian" flag.

May 27—Pearson presents his proposals for a new flag and new anthem to Parliament.

Cyprus

May 3—The White House announces that U.S. President Johnson has asked Senator J. W. Fulbright to undertake a mission to Greece and Turkey to express U.S. concern over the Cyprus situation. Fulbright will leave tomorrow.

May 4—A U.N. mediator in Cyprus, Sakari S. Tuomioja, returns from a trip to Greece, France, Britain and the U.N.

May 6—Sporadic shooting erupts after 5 days of relative calm.

May 11—An ex-President of Ecuador, Galo Plaza Lasso, is appointed special representative in Cyprus for U.N. Secretary-General U Thant. His job will be to negotiate a settlement between the Greek and Turkish Cypriotes.

In the Turkish quarter of Famagusta, 2 Greek army officers, one Greek Cypriote policeman, and one Turkish Cypriote are killed.

May 16—The U.N. Command in Cyprus orders its forces to shoot if necessary to protect Cypriotes. The order is issued following repeated fighting between Turkish and Greek Cypriotes.

May 17—The U.N. Command declares that Turkish Cypriotes seized by Greeks in Famagusta should be released.

May 19—It is disclosed that Makarios has told Galo Plaza Lasso that he is unable to account for the whereabouts of 74 of the 91 Turkish Cypriotes seized since March 27, 1964.

May 20—A Finnish member of the U.N. peace force is killed by Turkish Cypriote fire.

Great Britain

May 8—With returns reported from 377 of the 390 Town Councils in yesterday's municipal elections in England and Wales, the Labour party gains 254 seats. The Conservative party loses 132 seats.

May 27—It is announced from Buckingham Palace that Queen Elizabeth II and the Duke of Edinburgh will visit West Germany in May, 1965.

India

May 1—The Indian Minister of Steel and Heavy Industry declares that the Soviet Union has offered to help build the first stage of a steel mill at Bokaro.

May 2—The Kashmiri leader, Sheik Mohammed Abdullah, declares that talks with Indian Prime Minister Jawaharlal Nehru are progressing "satisfactorily."

May 9—It is reported that Sheik Mohammed Abdullah has proposed that Kashmir be ruled by Pakistan and India under a condominium.

May 10—Washington sources report that the U.S. will provide considerable military aid for India. Indian Defense Secretary P. V. R. Rao arrives in the U.S. for negotiations on arms assistance.

May 16—Addressing the 850 members of the All-India Congress Committee, Prime Minister Nehru declares that the murder of Muslims by Hindus in eastern India is deplorable.

May 27—Prime Minister Jawaharlal Nehru dies at the age of 74.

Malaysia, Federation of

(See also *Indonesia*)

May 23—Prime Minister Abdul Rahman agrees to confer with Indonesian President Sukarno and Philippine President Diosdado Macapagal on the controversy over the Federation of Malaysia. As a condition of the talks, Indonesian guerrilla bands in Sarawak and Sabah will be withdrawn under Thai supervision.

May 30—A Malaysian spokesman announces formally that Prime Minister Abdul Rah-

man will confer in Tokyo in June with Indonesian and Philippine leaders unless a border check shows that most of the Indonesian rebels in Sarawak and Sabah (part of the Federation) have not been withdrawn.

Pakistan

(See *Intl, U.N.*)

United Republic of Tanganyika and Zanzibar

May 10—President Julius K. Nyerere addresses a meeting of the ruling parties of Tanganyika and Kenya; he declares that the United Republic hopes for a merger with Uganda and Kenya.

BRITISH DEPENDENCIES

Basutoland

May 15—Colonial Secretary Duncan Sandys tells the British House of Commons that Britain has agreed to give self-government to Basutoland, and possibly complete independence in a year.

British Guiana

May 13—A 3-member commission is appointed to investigate the 3-month old sugar workers' strike.

May 22—Governor Sir Richard Luyt proclaims a state of emergency after several incidents in which members of the Negro population attacked the Indian populace.

May 24—Race riots erupt between Indians and Negroes. More British troops arrive by air to help preserve order.

Malta

May 2—A 3-day referendum begins on immediate independence for Malta and on the form of government an independent Malta should adopt.

May 6—Final figures in the referendum are 65,714 "yes" votes in favor of a draft constitution establishing Maltese independence under a monarchy; some 54,919 "no" votes oppose the draft constitution. Prime Minister George Borg Olivier declares that the

vote is a victory for his Nationalist party (which supports a monarchical system).

Northern Rhodesia

May 5—A London conference on independence for Northern Rhodesia opens.

May 19—At the close of the conference, British Colonial Secretary Duncan Sandys announces that Northern Rhodesia will become independent on October 24, 1964. The new state will be known as Zambia.

South Arabia, Federation of

May 5—In skirmishes with rebel tribesmen harassing one of the main trade routes in the Federation, 2 British paratroopers are killed and 10 are wounded. Britain has charged that the rebels have received support from Yemen and the U.A.R.

May 6—At the U.N. Security Council, Britain announces that she favors demilitarization of the Yemeni-South Arabian border zone.

May 11—British Colonial Secretary Sandys, on a trip to the Federation, confers in Aden with the British High Commissioner.

May 13—Following talks with ministers of Aden and of the Supreme Council of the South Arabian Federation, Sandys announces a constitutional conference on Aden and the Federation to be held in June in London.

May 21—British jet planes bomb rebel forts in the Radfan Mountains.

CAMBODIA

May 8—Military sources report that a South Vietnamese armored personnel carrier was destroyed by Cambodian fire when it accidentally crossed into Cambodia while pursuing Vietcong rebels.

May 12—A demonstration outside the National Assembly is held to urge the ouster of all U.S. citizens from Cambodia.

May 13—In a note to the U.N. Security Council, Cambodia asks that the U.N. consider acts of aggression against Cambodia by U.S.-South Vietnamese troops. (See also *Intl. U.N.*)

May 19—Western intelligence officials report collusion between Vietcong rebels from

South Vietnam and Cambodian border officials whereby Vietcong rebels are permitted to enter Cambodia.

CHINA, PEOPLE'S REPUBLIC OF (Communist)

May 6—It is reported that a program is being put into effect under which political supervisors will use military organizational techniques and propaganda to mobilize workers for greater production.

CONGO, REPUBLIC OF THE (Leopoldville)

May 27—In Katanga Province, Congolese rebels attack and capture an airfield.

CUBA

May 5—Cuban newspapers report that a cache of U.S. weapons and Cuban money has been found submerged in Cuban waters. In the U.S., sources report that the weapons were hidden in 1961 for use by the Cuban underground.

May 17—It is reported that members of the anti-Castro Revolutionary Junta under Manuel Ray are making their way toward Cuba to rebuild the underground and to subvert the government of Premier Fidel Castro.

May 19—The Cuban government sends a note to the U.S. deploring the recent U.S. order that commercial food and drug shipments for Cuba require export licenses.

May 20—The Cuban Revolutionary Junta issues a proclamation in Miami announcing that an anti-Castro war of independence has begun; the proclamation is broadcast to Cuba. Another anti-Castro exile group, the Second Front of the Escambray, also broadcasts a call to arms to Cubans.

May 22—Unconfirmed reports reveal that a group of infiltrators who landed in the Province of Pinar del Rio have been captured by Cuban army forces.

CZECHOSLOVAKIA

May 2—It is reported that yesterday during May Day celebrations thousands of demonstrators fought with police.

DOMINICAN REPUBLIC

- May 3—Crowds riot in Santo Domingo in the wake of a bus and taxi drivers' strike called yesterday. In radio broadcasts, the government warns that the strike is illegal.
- May 4—Dominican soldiers begin operations in Santo Domingo to safeguard order.
- May 5—It is reported that over 800 persons have been arrested as the government attempts to end the strike.
- May 9—It is reported that the transit strike ended yesterday.

FRANCE

- May 8—A qualified source at Allied Supreme Headquarters reports that the French independent nuclear force is not operational.
- May 13—At a meeting, the French cabinet decides to eliminate aid to Tunisia because of nationalization of French-owned lands there. Originally the land was to be nationalized over a 5-year period.
- May 17—At the close of the 17th congress of the French Communist party it is announced that Maurice Thorez will be replaced by Waldeck Rochet as secretary-general; Thorez will become party president.

GERMANY, DEMOCRATIC REPUBLIC OF (East)

- May 29—Walter Ulbricht, head of the East German Communist party, arrives in the Soviet Union for a state visit. He is welcomed by Premier Khrushchev.

GERMANY, FEDERAL REPUBLIC OF (West)

- May 9—U.S. Secretary of Defense Robert S. McNamara arrives for talks with West German Defense Minister Kai-Uwe von Hassel.
- May 11—It is reported that Britain and the U.S. support a meeting between West German Chancellor Ludwig Erhard and Soviet Premier Nikita Khrushchev.
- May 13—The Government announces that on July 1 tariffs on industrial goods will be reduced to help offset a surplus in Germany's foreign trade balance.
- May 26—The West German Foreign Ministry tells Parliament that West Germany did not

yield to U.S. pressure for West German assistance in South Vietnam.

GUATEMALA

- May 24—Elections for 80 representatives to the Constituent Assembly are held. The 2 parties participating in the election will receive 10 seats each; the remaining 60 will go to the military government.

INDONESIA

- May 3—President Sukarno issues an "action command" ordering 21 million volunteers to help the peoples of the Federation of Malaysia gain independence. (See also *British Commonwealth, Federation of Malaysia*.)
- May 5—The U.S. Assistant Secretary of State for Far Eastern Affairs, William P. Bundy, declares that if Indonesia intensifies her guerrilla warfare in Malaysia, she runs the risk of losing the remaining U.S. aid programs.

IRAQ

- May 3—President Abdel Salam Arif, in a speech introducing a provisional constitution, declares that the main goal of the constitution is union with the U.A.R. In his speech Arif voices support for U.A.R. President Gamal Abdel Nasser. (See also *U.A.R.*)

ISRAEL

- May 4—The Knesset (parliament) adopts a resolution urging the West German government to prevent its scientists from helping the U.A.R. develop rockets.

JAPAN

- May 14—A Soviet First Deputy Premier, Anastas I. Mikoyan, arrives in Japan for a 2-week visit. He meets with Premier Hayato Ikeda.

KOREA, REPUBLIC OF (South)

- May 9—President Chung Hee Park reorganizes his cabinet. Foreign Minister Chung Il Kwon is named premier.
- May 20—In Seoul, over 1,000 student and other demonstrators fight with police.

LAOS

May 1—British Foreign Minister R. A. Butler and Soviet Foreign Minister Andrei A. Gromyko issue a declaration denouncing the rightist coup d'état last month. (Britain and the Soviet Union served as co-chairmen of the 1954 Geneva conference on Indochina.)

May 2—Neutralist Premier Souvanna Phouma, at a news conference, announces that the neutralist and rightist factions have united; he hopes that the third faction, the pro-Communist Pathet Lao, will merge with them. Phouma announces that the rightists have placed their military command under the defense ministry; as defense minister, Phouma states that he will direct all military matters.

May 4—Phouma leaves for Pathet Lao headquarters for talks with Prince Souphanouvong, leader of the leftist faction.

May 5—Phouma returns to Vientiane after talks with Souphanouvong. A spokesman for the Pathet Lao declares that his faction will not recognize the neutralist-rightist merger.

May 13—*Hsinhua* (Chinese Communist press agency) releases the text of a letter sent by Foreign Minister Chen Yi to Britain and the U.S.S.R. charging that the U.S. is responsible for the Laotian coup; he demands that the neutralist-rightist "clique" be dissolved.

May 15—The Defense Ministry announces that yesterday Pathet Lao forces captured the town of Tha Thom.

May 16—Premier Phouma charges that Pathet Lao, aided by North Vietnamese forces, have opened an all-out offensive in Laos.

May 17—Members of the I.C.C. (International Control Commission) on Laos (India, Canada and Poland) report that General Kong Le has fled from the Plaine des Jarres, and that neutralist soldiers appear to have crumbled before a heightened Pathet Lao assault.

May 19—A U.S. State Department spokesman declares that the U.S. is willing to

"preserve the neutrality and independence of Laos" by any measures short of military intervention. He says that "we have no reason to doubt the presence of North Vietnamese cadres" in Laos in support of the Pathet Lao.

May 20—Official sources in Paris report that French President Charles de Gaulle has sent notes to Britain and the U.S.S.R. urging that the signatories to the 1962 declaration on Laos be reconvened to consider the current crisis.

Advancing Pathet Lao soldiers force neutralist troops to retreat southwest from the Plaine des Jarres.

May 21—A U.S. State Department spokesman discloses that the U.S. has ordered reconnaissance flights over the Plaine des Jarres to spy on Communist troop movements; the flights were undertaken at the request of the Laotian government, because the I.C.C. was not able "to obtain adequate information."

At the U.N., U.S. Representative Adlai Stevenson denounces aggression in Laos and South Vietnam. (See also *Int'l, U.N.*)

General Kong Le regroups his remaining 4 neutralist battalions at Ba Na on the western edge of the Plaine des Jarres.

May 22—Premier Souvanna Phouma declares that he will ask France, Britain and the U.S. for military and economic aid to counter the Communist offensive.

May 23—The Soviet Union announces that it has proposed to the British that they should call a new 14-nation Geneva conference on Laos.

May 26—In a letter from Marshal Chen Yi to Britain, it is disclosed that Red China has rejected the British plea for Chinese Communist help in restoring peace to Laos.

May 27—The U.S. State Department declares that it has sent some T-28 planes to Laos at the request of Phouma. It is also announced that the Assistant Secretary of State for Far Eastern Affairs, William Bundy, is en route to London to confer with British authorities on Laos.

May 31—It is disclosed that yesterday Vice-

Premier Prince Souphanouvong sent a telegram to Premier Phouma requesting that the Neo Lao Hak Xat Secretaries of State in the coalition government be allowed to leave Vientiane in a protest against the recent cabinet reshuffle replacing pro-Communist ministers. The Neo Lao Hak Xat is the political branch of the Pathet Lao.

LEBANON

May 9—President Fuad Chehab declares that he will not seek reelection; his 6-year term is due to expire later this year.

PANAMA

May 4—Leading Panamanian officials disclose that Panama will ask the U.S. for major economic concessions but will not press for full revision of the Canal Zone treaty with the U.S.

May 10—Elections for president and the unicameral national assembly are held.

May 13—The electoral tribunal announces final election results. Marco A. Robles, the government supported candidate, is announced the new president. Dr. Arnulfo Arias, presidential runner-up, charges that the election returns have been "falsified."

PERU

May 22—The first major land reform law is promulgated by President Fernando Belaunde Terry; expropriated lands will be distributed to peasants.

PHILIPPINES, THE

(See *British Commonwealth, Federation of Malaysia*)

RUMANIA

May 18—In Washington, the U.S. and Rumania open economic and trade talks; the 2 countries will also discuss their mutual relations. U.S. Under Secretary of State for Political Affairs W. Averell Harriman leads the U.S. delegation. A Rumanian Deputy Premier, Gheorghe Gaston-Marin, heads the Rumanian delegation.

May 26—A Rumanian delegation arrives in the Soviet Union. The delegation meets with Soviet President Leonid I. Brezhnev

and the Soviet ideologist, Mikhail Suslov.

SOUTH AFRICA, REPUBLIC OF

May 23—The South African government orders a new, more stringent, 5-year curb on the activities of Chief Albert J. Luthuli, who advocates a multiracial society. The 1959 order restricting Luthuli to his home in Groutville, an African reserve, was due to expire within a few days.

SYRIA

May 10—It is reported that last night the National Revolutionary Council led by the Premier, Major General Amin el-Hafez, asked ex-Premier Salah el-Bitar to form a new provisional cabinet.

May 13—A Syrian cabinet led by el-Bitar is announced. A 5-member presidential council led by el-Hafez is also announced. An interim constitution adopted in April provided for a presidential council and cabinet to govern Syria for 1 year.

TUNISIA

(See *France*)

U.S.S.R., THE

(See also *German Democratic Republic* and *U.S. Foreign Policy*)

May 1—At a May Day ceremony, Soviet Premier Khrushchev declares that "flights into Cuban airspace may have catastrophic consequences." He denounces official U.S. statements asserting that U.S. reconnaissance missions over Cuba are in accord with the Khrushchev-Kennedy understanding on Cuba reached in October, 1962. Visiting Algerian President Ahmed Ben Bella is given the title Hero of the Soviet Union during a Kremlin dinner.

May 4—*Izvestia* (Soviet government newspaper) publishes a government declaration sent to Asian and African nations. The declaration accuses the Chinese Communists of racist policies, and rebuts a Chinese statement to the effect that the Soviet Union is not an Asian or an African power.

May 8—In a letter to the Central Committee of the C.P.S.U., the Chinese Communist party warns that an international confer-

ence of Communist parties to discuss the Sino-Soviet ideological rift may need 4 or 5 years preparation; if such a conference were convened this fall, as has been suggested by the U.S.S.R., a real split might develop within the ranks of the Communist movement.

May 9—Premier and Mrs. Khrushchev arrive in Cairo; they are greeted by U.A.R. President and Mrs. Nasser.

May 10—*Pravda* (Soviet party organ) publishes an article stating that the world Communist movement is meant to be a "voluntary union of like-minded people"; no one party should have a "leading role."

May 11—Khrushchev tells the U.A.R. legislature that he supports Arab opposition to Israeli plans to divert the Jordan River waters.

May 17—Otto V. Kuusinen, one of the 12 full members of the Presidium of the Communist party, dies at 82.

May 19—It is made public that over 40 microphones have been discovered embedded in the walls of the U.S. Embassy in Moscow. U.S. Ambassador Foy D. Kohler sends a note of protest to the Soviet government. The microphones were planted 11 years ago.

May 25—Khrushchev returns to Moscow after a 16-day visit to the U.A.R. (See also *U.A.R.*)

UNITED ARAB REPUBLIC

May 6—Soviet Premier Nikita Khrushchev leaves for a visit to the U.A.R. to attend ceremonies celebrating the completion of the first stage of the Aswan High Dam.

May 10—In Cairo, Khrushchev confers with U.A.R. President Gamal Abdel Nasser.

May 14—Khrushchev and Nasser press a button to open a channel diverting the Nile waters; this marks the completion of the first stage of the Aswan High Dam building project.

May 20—In Cairo Khrushchev meets with Iraqi President Abdel Salam Arif.

May 24—At a farewell dinner given by Khrushchev for Nasser, it is announced that the Soviet Union will lend \$277 mil-

lion to the U.A.R. for its second five-year plan beginning in 1965.

May 26—Nasser and Arif sign an agreement providing for a joint Iraqi-U.A.R. military command in time of war and for greater unity between the 2 countries.

UNITED STATES

Civil Rights

(See *Segregation and Civil Rights*)

Economy

May 19—The Commerce Department reports that in April personal income rose \$2.2 billion, to a seasonally adjusted annual rate of \$483.1 billion.

Foreign Policy

May 6—At a news conference President Lyndon B. Johnson announces that Secretary of Defense Robert S. McNamara will visit West Germany and South Vietnam. (See also *Germany*.)

May 11—At a White House meeting attended by ambassadors from Latin American countries and Alliance for Progress officials, President Johnson strongly emphasizes U.S. interest in promoting political democracy and economic development in Latin America. Afterwards, with officials from 13 Latin American states, he signs aid agreements and commitments totaling some \$40 million.

May 14—At a news conference following a meeting with the President, Secretary McNamara declares that he has proposed increased military and economic assistance in South Vietnam, where Communist guerrillas have intensified their efforts. McNamara and General Maxwell D. Taylor (Chairman of the Joint Chiefs of Staff) have just returned from their trip to South Vietnam. (See also *Vietnam*.)

The Commerce Department issues an order restricting food and drug sales to Cuba; the order requires export licenses for such sales.

May 18—In a special message to Congress, Johnson requests an additional \$70 million in economic aid and \$55 million in military assistance for South Vietnam.

May 23—President Johnson, at a dedication ceremony for the George C. Marshall Research Library at the Virginia Military Institute, promises that his Administration will seek to further the goals of the Marshall Plan by the "wise and skillful development of relationships with the nations of Eastern Europe."

May 27—Johnson welcomes Ireland's President Eamon de Valera to Washington.

It is announced that the U.S. and the U.S.S.R. have drafted a consular treaty under which greater protection will be afforded citizens of one country visiting the other. Unconditional diplomatic immunity from prosecution will be granted consular officials. At least one consulate will be opened in each country in a city outside Moscow and Washington. The U.S. Senate must ratify the treaty. The treaty is scheduled to be signed in Moscow on June 1.

May 28—President Johnson asks Southeast Asian experts to meet in Honolulu early next week to confer on the Laotian and Vietnamese situations. Specialists from Washington and from U.S. missions in Southeast Asia will be present.

May 29—Before departing from India where he has attended Nehru's funeral, Rusk confers with a Soviet First Deputy Premier, Aleksei N. Kosygin.

May 30—In Bangkok, Rush meets with Thai Premier Thanon Kittikahorn and Foreign Minister Thanat Khoman on Southeast Asian unrest as it affects Thailand.

Government

May 4—President Johnson announces that he has accepted with regret the resignation of Teodoro Moscoso as the U.S. representative on the Inter-American Committee for the Alliance for Progress.

At a White House dinner for 61 labor leaders, Johnson promises to promote full employment; if private enterprise is not able to absorb the unemployed, the government will increase "programs of public works."

The U.S. Public Health Service declares

that endrin (a pesticide used on sugar cane and cotton crops in the South) was responsible for the dead fish found in the Mississippi and Atchafalaya Rivers in 1963-1964.

May 7—President Johnson begins a two day tour of poverty-stricken areas in 6 Appalachian states: Maryland, Ohio, West Virginia, North Carolina, Tennessee and Georgia.

May 8—In Georgia, Johnson tells crowds that "the Constitution of the United States applies to every American, of every race. . . ."

Sargent Shriver, head of the "war against poverty" program, asks the members of the Business Council (composed of heads of large corporations) to donate some \$30 million to help fight poverty.

President Johnson signs an executive order exempting Director of the F.B.I. J. Edgar Hoover from the compulsory retirement law; Hoover will reach the compulsory retirement age (70) on January 1, 1965.

May 12—Chairman of the House Appropriations Committee Clarence Cannon (Missouri Democrat) dies at the age of 85.

May 13—The House of Representatives, by a voice vote, approves a \$312 million contribution to the International Development Association. The bill, formerly approved by the Senate, is sent to the White House.

May 14—The Commerce Department releases official figures showing that the U.S. balance of payments deficit decreased sharply in the first quarter of 1964.

The Senate rejects a resolution that the Rules Committee extend its investigation of the affairs of Robert (Bobby) Baker.

May 19—Johnson orders 2 airplane and 2 engine design companies to begin studies for developing a supersonic jet airliner.

May 22—Commissioner of Internal Revenue Mortimer M. Caplin resigns for personal reasons.

Johnson addresses the University of Michigan graduating class; he declares that urban America must be rebuilt; that the rural U.S. must be preserved; and that the quality of education must be upgraded.

May 25—The Administration requests a \$9

billion increase in the national debt ceiling, raising it to \$324 billion.

Mrs. Virginia Brown is sworn in as a member of the Interstate Commerce Commission. Mrs. Charlotte Moton Hubbard (a Negro) is sworn in as Deputy Assistant Secretary of State for Public Affairs.

May 28—The White House announces that yesterday Johnson signed a measure authorizing \$23.5 million in aid for Alaska.

Labor

May 7—An arbitration award allowing the nation's railroads to eliminate some firemen's jobs becomes effective. Three wild-cat strikes occur in protest.

May 11—U.S. Secretary of Labor W. Willard Wirtz announces that investigation has begun of the use of union funds to pay the legal fees for International Brotherhood of Teamsters' President James R. Hoffa.

May 19—The executive council of the A.F.L.-C.I.O. issues a statement rejecting the wage guideposts outlined by the President's Council of Economic Advisers, to curb the wage-price inflationary spiral.

May 26—An arbitration board declares that railroad management may replace low seniority firemen in states where they are required on trains, with high-seniority firemen from other states.

Military

May 1—President Johnson names General John P. McConnell as Vice Chief of Staff of the Air Force next July 31; he will succeed retiring General William F. McKee.

May 13—In a letter to the House Armed Services Committee, Air Force Secretary Eugene Zuckert declares that the T-28 trainers and B-26 bomber-fighter planes used in Vietnam are "performing outstandingly."

May 23—It is reported that in April the Atomic Energy Commission lost some 2.2 pounds of the lethal plutonium 238 (valued at \$1 million) when a satellite failed to orbit. The payload supposedly burned up on reentering the atmosphere over the coast of Africa.

Politics

May 3—It is reported that in yesterday's presidential primary in Texas, Senator Barry Goldwater of Arizona received over 99,000 votes in the Republican primary; Henry Cabot Lodge ran second with over 11,000 write-in votes.

May 6—Final unofficial figures from the Indiana presidential primary yesterday are reported. In the Democratic primary, Indiana Governor Matthew E. Welsh received 368,401 votes; Alabama Governor George C. Wallace, 170,146. In the Republican primary, Senator Barry Goldwater won over Harold E. Stassen, 260,557 to 104,200 votes.

May 15—New York Governor Nelson A. Rockefeller, candidate for the Republican presidential nomination, confers with President Johnson at the White House after receiving a briefing on foreign and defense policies.

May 17—Almost complete returns from the Oregon presidential primary are reported. In the Republican primary Rockefeller led with over 93,000 votes; Henry Cabot Lodge received some 78,227 votes; Goldwater received 49,784 votes; Nixon 47,621 votes; Maine Senator Margaret Chase Smith, 8,268; and Pennsylvania Governor William Scranton 5,716.

May 18—Jack W. Crumley, co-chairman of the California Draft Lodge for President Committee, announces that his organization will put its support behind Rockefeller in the California primary on June 2. Rockefeller and Goldwater are the only Republican candidates running in California, where write-in votes are not allowed.

May 20—In the Maryland presidential primary held yesterday, it is reported that Senator Daniel B. Brewster received 53.6 per cent of the Democratic vote; Alabama Governor Wallace received 42.8 per cent. Final unofficial figures are 264,613 votes for Brewster and 212,068 votes for Wallace.

May 24—In a radio and television broadcast, Goldwater suggests that one possible strategy in the war in Vietnam might be "de-

foliation of the forests by low-yield atomic weapons."

May 25—A statement by ex-President Eisenhower prepared for the *New York Herald Tribune* is published. Without mentioning names or indicating his preference, Eisenhower describes the type of candidate who he believes would be a good choice for the Republican party. The candidate should represent "responsible, forward-looking Republicanism," including support for civil rights and for the United Nations.

The Governor of Oregon, Mark O. Hatfield, is chosen as keynote speaker and temporary chairman of the Republican National Convention. Kentucky Senator Thruston B. Morton is named permanent chairman.

Goldwater, during an address in California, declares that Eisenhower's statement on the Republican presidential nominee is "most welcome."

May 28—In New York City, Johnson attends 2 fund-raising dinners and a show at Madison Square Garden for the Democratic party.

Segregation and Civil Rights

May 1—The quadrennial conference of the Methodist Church (representing some 10 million members) approves a plan to eliminate its all-Negro central jurisdiction during the next 4 years; the 5 other jurisdictions will absorb the central jurisdiction.

White plumbers at a city construction project in New York refuse to work with 4 newly hired non-union plumbers (3 of whom are Puerto Rican and 1 Negro). A spokesman declares that the plumbers refuse to work with non-union persons. The City Commission on Human Rights, investigating the episode because of racial overtones, calls a conference of the interested parties.

May 11—In Cambridge, Maryland, National Guard forces disperse several hundred Negro demonstrators with tear gas following an appearance by Alabama Governor George C. Wallace.

May 12—A report prepared by an Advisory Committee on Human Relations and Community Tension is made public by New York State Education Commissioner James E. Allen Jr. The report makes recommendations for integrating New York City public schools, but declares that total integration is impossible. The report suggests replacing conventional school divisions with 2-year kindergartens, with primary schools encompassing grades one to four; and with middle schools covering grades five to eight. High schools will include grades 9 to 12. Educational complexes will group primary schools around a middle school.

May 16—New York City Mayor Robert Wagner announces that agreement has been reached on the plumbers' controversy: the 4 non-union men will take the journeyman plumbers' test; if they pass, they will receive membership in Union Local 2.

May 18—At New York's City Hall a rally is held in support of school integration. Under the direction of Bayard Rustin, the rally attracts 4,000-5,500 persons instead of the desired "15,000 and one." The rally also endorses the advisory committee's plan for integrating New York City public schools.

Three of the 4 non-union plumbers take the job qualification test and fail.

May 28—Superintendent of New York Schools Calvin E. Gross announces a plan for integrating the public schools and for upgrading educational content. An estimated 40 thousand children in over 16 schools will be affected.

The Rev. Dr. Martin Luther King, President of the Southern Christian Leadership Conference, urges "men of conscience" to join civil rights demonstrators in St. Augustine, Florida.

Supreme Court

May 4—The Supreme Court refuses to review a Seventh Circuit Court of Appeals decision that boards of education are not required to eliminate segregated schools resulting from housing patterns. The lower court

ruling found that school districts in Gary, Indiana, were not drawn along racial lines but that population shifts had created the racial imbalance.

May 18—In a 5-3 decision, the Supreme Court rules unconstitutional a federal law depriving naturalized citizens of their U.S. citizenship if they return to live in their country of origin for 3 years.

May 25—The Supreme Court unanimously rules that the closing of public schools in Prince Edward County, Virginia, since 1959, is unconstitutional; the schools in one county cannot be closed while public schools in the rest of Virginia remain open. In the opinion by Justice Hugo L. Black, the Court warns against "too much deliberation and not enough speed in enforcing the constitutional rights which . . . had been denied Prince Edward County Negro children." The case is sent back to the District Court which is ordered to give "quick and effective" relief. In his opinion, Black argues that a state may not maintain segregation by replacing public schools with private schools "supported directly or indirectly by state or county funds."

VATICAN, THE

May 17—Pope Paul VI announces the formation of a Secretariat for Non-Christians to establish a "respectful dialogue" with religious groups that do not accept the divinity of Jesus Christ.

VIETNAM, SOUTH

May 2—In Saigon Harbor, the U.S.N.S. *Card* is sunk by Communist terrorist explosives.

May 3—Eight U.S. soldiers are wounded when a bomb explodes in a crowd in Saigon Harbor. One Vietnamese is also hurt.

May 9—Ngo Dinh Can, brother of the late President Ngo Dinh Diem, is executed.

May 12—U.S. Secretary of Defense McNamara arrives in South Vietnam, to review the military offensive against pro-Communist Vietcong rebels. (See also *U.S. Foreign Policy*.)



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—Russell Lenz, Chief Cartographer

VIETNAM

May 15—Premier Nguyen Khanh signs a decree giving complete religious freedom to Buddhists.

May 17—A military spokesman reports that Vietcong forces staged 5 attacks on South Vietnamese targets near the Cambodian frontier. Some 36 Vietnamese soldiers are killed.

May 22—Speaking before the American Law Institute, U.S. Secretary of State Rusk cautions that the war in South Vietnam may spread if "the Communists persist in their course of aggression."

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